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MAY 1951

BUSINESS · ENGINEERING · INDUSTRY

Point Four Pilot Plant—Page 19

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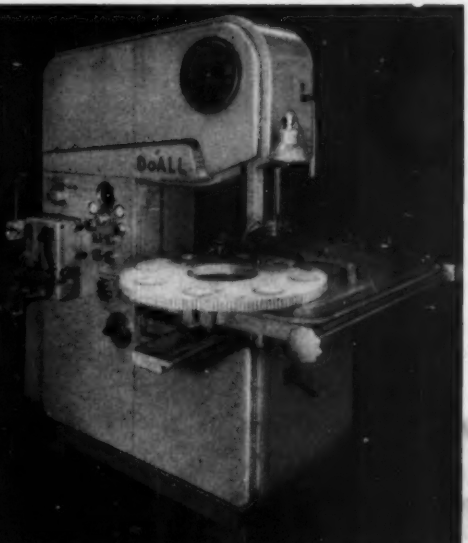

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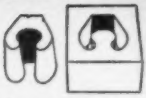

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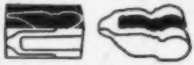

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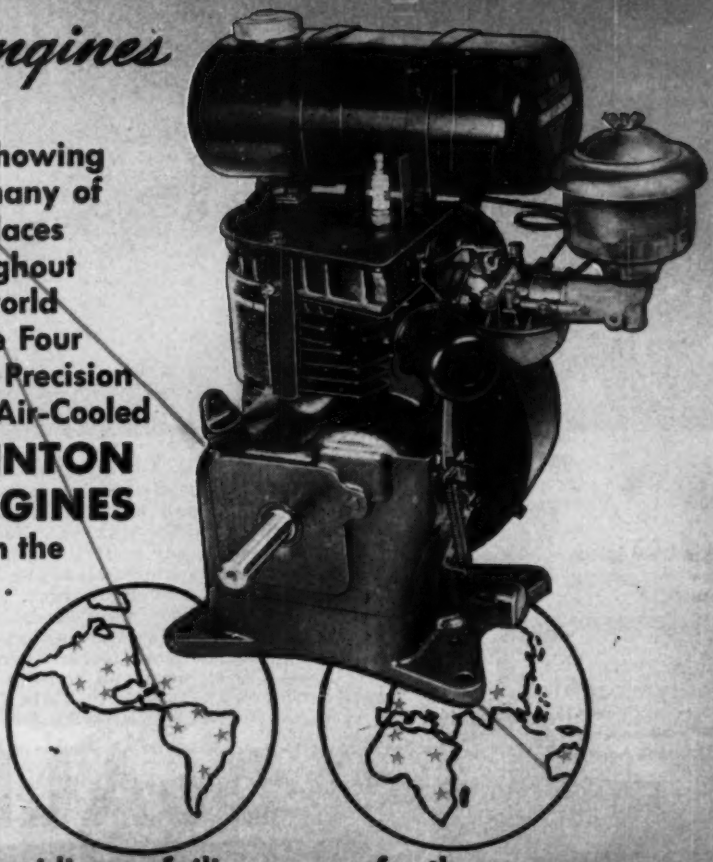

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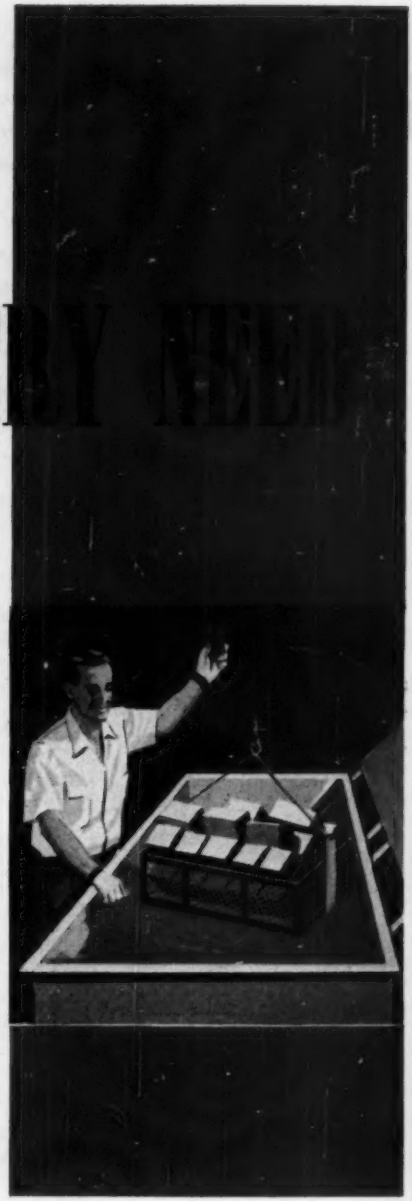

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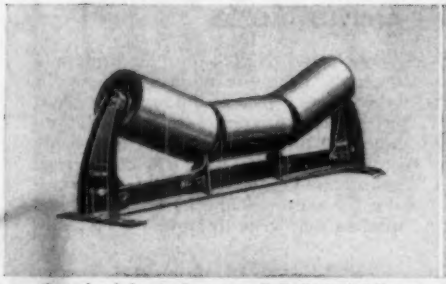

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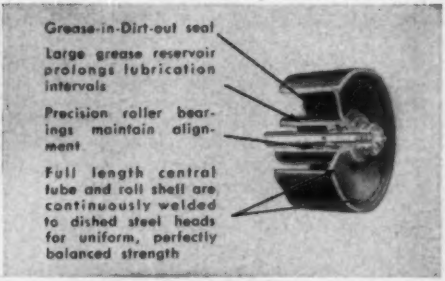
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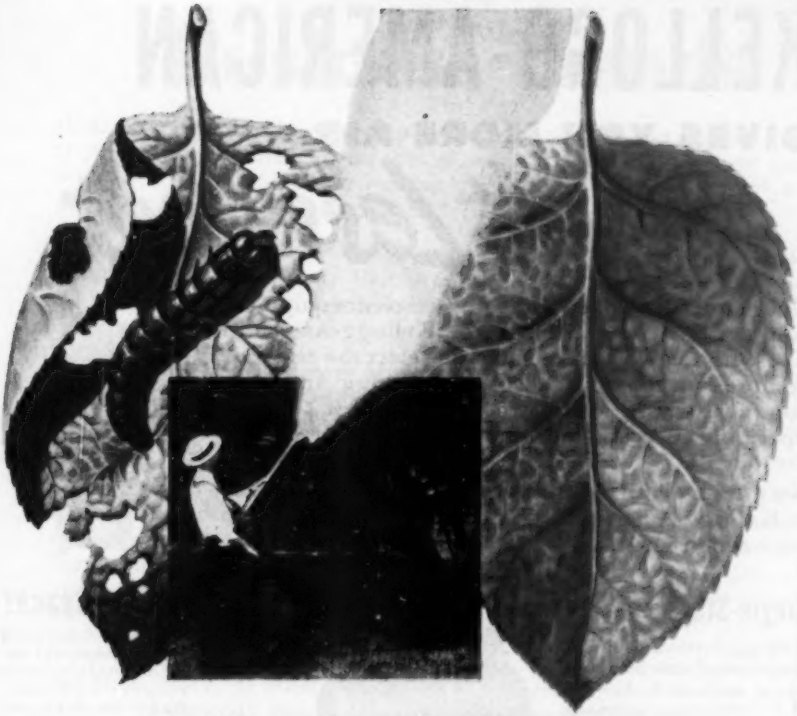

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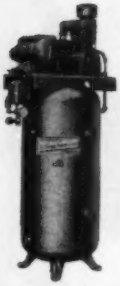

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# Business Trends

**U. S. INDUSTRY** is planning a record expansion of productive capacity this year. If all plans are carried out, capacity of manufacturing industries will gain 9% in 1951. Source of data is McGraw-Hill's fourth annual survey of business plans for new plant and equipment.

**To get this increase**—and to go on modernizing old capacity—would cost manufacturers $13.3-billion. That is 66% more than they spent last year. For all industry, cost of completing investment plans would be about $21.5-billion, a rise of 45% over 1950.

**This is part of a long wave of expansion**—with an added boost from war in Korea. Manufacturing industries have raised capacity 75% since 1939, 7% in the last year alone. Now Washington is urging more industrial growth as the base for a long siege of mobilization.

**Mobilization influence** shows in comparing investment plans. The largest growth in spending is scheduled for industries important in war. Transportation equipment records the biggest increase over 1950—277%; most is for aircraft. Nonferrous metals show an increase of 175% in investment plans, electric machinery 74%, steel 134%, chemicals 59%. A much bigger slice of spending will go for expansion than for replacement and modernization.

**But expansion is not limited to war industry.** Washington wants more production for civilians—to offset inflation—and businessmen want to take advantage of booming demand. Result: almost all industries plan to expand.

**Planned expansion will probably not be reached.** Inflation will eat away some of the investment dollar; capital goods already cost at least 10% more than a year ago. Some capital spending will be held up by shortages of materials. But capital spending should reach record heights this year.

**MANY COUNTRIES** will experience shortages in the near future because of U. S. expansion. In the long run, that expansion will mean more exports available from the U. S.

**U. S. output of key machinery** for defense work is rising, and government will help by giving priorities for scarce materials and by granting tax concessions on depreciation of new facilities. These actions will speed expanding output of farm machinery, oil-field equipment, transportation equipment, and other equipment.

**But American-made machinery will be hard to get**—for those without priorities. Most will go to essential domestic industry, some to defense industries in other countries (see p22). Little will be left for other buyers.

**Machine tools are an example.** U. S. government is backing increased production. But 70% of output is expected to be allocated for direct defense production

# Business Trends (Continued)

at home and 30% to other essential users, including defense work abroad. That will leave few new tools for nonessential production.

**Output of non-defense machinery** may have to be cut to provide steel and facilities for essential production. Cutbacks may be in order for textile machinery, food processing machinery, construction equipment, office machinery, and others. If output of this equipment falls, exports will suffer. But by 1952-1953, new factories will be tooled up, ready to produce a greater flood of goods than ever before.

**MOBILIZATION IS BOOSTING** the U. S. market for imported finished goods, especially those of higher quality. Stores are ordering now in anticipation of future shortages of domestic products.

**Demand for imported goods will grow** as the U. S. defense effort speeds up. Supplies of domestic consumers' goods are still large. So far, even production of consumers' durables has not fallen much while the output of soft goods has set new records. But later in 1951, consumers will feel the pinch as U. S. industry switches from peace-time production to defense work. Then demand for imported goods should soar. Higher personal incomes will give demand another push upward. Total U. S. personal income is expected to rise at least 10-12% during the year.

**Supply, not sales, is the main problem for U. S. importers.** Already they can sell all the high-quality linen, laces, chinaware, perfumes, and toys they can get. But they cannot get enough. Deliveries are far behind on many of these items (which mostly are in the luxury class) and on the more popular makes of foreign automobiles. Such goods always sell best in a time of high incomes, and high incomes in the U. S. are now guaranteed by mobilization.

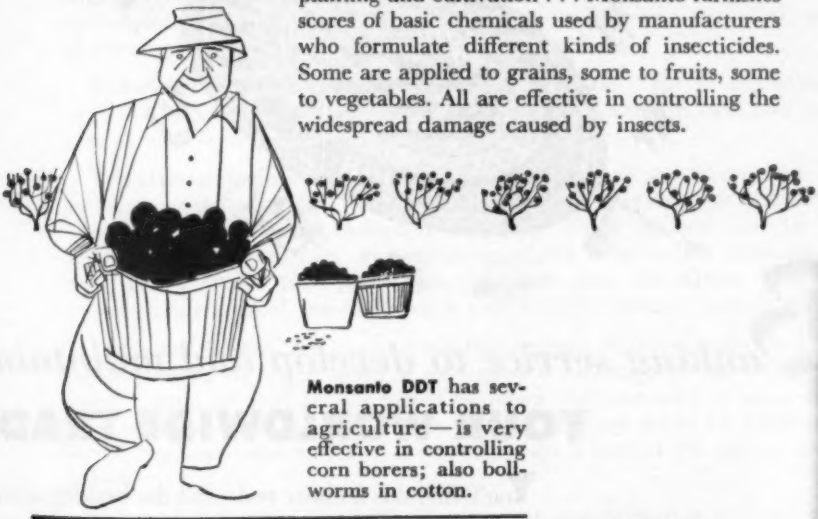
**RAISING EUROPEAN PRODUCTIVITY** by practical methods is the objective of a new committee of the Organization for European Economic Cooperation (OEEC). The Committee for Scientific and Technical Matters will organize cooperative programs of industrial research and development among the Western European nations. Hope is to raise Europe's standard of living by making better use of the resources available.

**The committee will work** through governments of member nations. Projects too expensive for one country alone will be handled jointly by all countries interested. All OEEC members will have access to the results.

**First project:** a two-pronged attack on Europe's fuel problem. A group of experts will work on low shaft blast furnaces designed to use low-quality solid fuels. Others will study wider use of windpower. OEEC estimates that Britain and France can produce as much power by wind as by all other means together—and save money at the same time.

## Fewer bugs . . . more food

MORE AND MORE farmers everywhere are using insecticides to kill bugs that would otherwise destroy crops. That's the way to raise more food —to get greater returns out of all the work of planting and cultivation . . . Monsanto furnishes scores of basic chemicals used by manufacturers who formulate different kinds of insecticides. Some are applied to grains, some to fruits, some to vegetables. All are effective in controlling the widespread damage caused by insects.



**Monsanto DDT** has several applications to agriculture—is very effective in controlling corn borers; also bollworms in cotton.

**Niran***—Monsanto parathion—is one of the most powerful insecticidal chemicals for increasing both quality and yield of many fruits and vegetables. Also useful in protecting greenhouse crops.

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# Washington Report

**PERMANENT MECHANISM** to administer foreign aid is beginning slowly to take shape in Washington. Congress and President Truman last fall asked Nelson Rockefeller, President of the International Basic Economy Corp., to act as chairman of a board established to draw up a plan.

**Rockefeller's board produced only a sketch** **(see p22)**. But its suggestions on technical assistance, loans and grants, and private investments may give you an idea of what is to come if peace can be maintained.

**Technical assistance:** Rockefeller chose for his model the Institute of Inter-American Affairs, which is now operating basic development projects, or "servicios", in 16 Latin American republics. These projects call for joint financing and joint staffing. Rockefeller would like to see similar institutes operating in the Middle East, South Asia, Southeast Asia, and Africa. The U. S., according to his report, should put up a total of $500-million a year at the start.

**Loans and Grants:** An International Development Authority, open to all free nations, should be set up under a management contract with the World Bank. Initial capital of $500-million should be raised from members in proportion to their subscriptions to the World Bank. The U. S. share would be $200-million. In no case would this authority cover more than a part of the cost of a given project.

**Private investments:** The U. S. should invite nations to join an International Finance Corp., to be set up as an affiliate of the World Bank. The Authority would be able to make loans in all currencies without requiring government guarantees. The loans would constitute non-voting equity investments. Initial capital, Rockefeller suggests, should be $400-million with the U. S. putting up $150-million.

**Rearmament-minded officials** greeted most of Rockefeller's ideas cooly. One exception: plans are underway to set up technical-assistance authorities, similar to the Institute of Inter-American Affairs, in other parts of the world. In the long run, some economists believe the private capital financing authority also may be a handy device.

**WASHINGTON COMPLACENCY** is paralyzing the U. S. rearmament program. The military buildup is getting further and further behind schedule. Hard decisions are being postponed. Foreigners and U. S. businessmen alike are exasperated at the confusion in U. S. policy.

**Another Russian move** could bring Washington to life again overnight. Russian trouble-making spurred the U. S. into the Marshall Plan and the North Atlantic Pact when both programs seemed about to fall through. But indications are that this time Moscow may stay quiet, and seemingly peaceful, hoping to

# Washington Report (Continued)

disorganize Western rearmament to the point where Communist political conquests will again be possible without resort to arms.

**CONGRESS WILL DEBATE** the new foreign-aid bill long and hard. The administration wants almost $7-billion in arms aid and economic support for rearmament in Western Europe, plus $500-million in Point-Four aid and $1-billion in new lending authority for the Export-Import Bank.

**Do not expect serious reductions.** But even more than last year, Congress will drag out the proceedings and haggle over details. The administration lacks the leadership in Congress that pushed foreign-aid bills through intact in the past. This time Congress will do considerable rewriting even if it provides the bulk of the money requested.

**LATIN AMERICANS** at the Western Hemisphere foreign ministers meeting this spring in Washington seemed glad to vote for resolutions against Communism, but apparently that was about as far as they wanted to go. The State Department tried to rally Latin America into mobilizing along the lines of the U. S. But the Latins had one answer: You can afford it; we cannot.

**The U. S. had two specific objectives:** (1) commitments to greater strategic-materials output and (2) commitments of troops both for Western Hemisphere defense and for future police actions or wars under the United Nations banner. The Latins agreed to all the generalities, but balked when the negotiations became specific, like sending soldiers to far-away places. What they wanted was the assurance that for their contributions this time they would get goods—not just dollars and nothing to buy with them. Most went away feeling they had not gotten what they came for.

## INTERNATIONAL GLIMPSES

**Revaluation talk is growing again.** Washington observers look for India and Ceylon to increase their exchange rates. Both countries need the boost to meet their budgets for imports.

**Greece and Turkey** will formally join the North Atlantic Treaty Organization if Washington has its way. U. S. Air Force officials have been pressing for the move. They want absolute assurance that they can use Greek and Turkish air bases the minute a war breaks out.

**Washington expects 320,000 Americans** to travel to Europe this year and spend $250-million while they are there. That means big earnings for foreign-flag trans-Atlantic shipping. Bookings may equal last year's 82% of capacity. And passenger capacity is up from 485,000 in 1950 to 525,000 in 1951. Airlines figure their capacity will stay about the same as last year's 251,000.

# . . . like looking through the stockroom walls!

For want of a small, yet important item, precious hours may be lost. That's why it's so necessary to see at a glance exactly what you have in stock, to learn in time where shortages threaten. Remington Rand's System of Kardex Control spotlights danger-points automatically!

**HELPS PREVENT OVERSTOCKING**—Storage and handling costs, markdown, interest on investment—all make slow-moving and obsolete items unprofitable. Reduce such losses with the Kardex Visible Control which warns you when *not* to buy.

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That's what Kardex Visible Control gives you—a graphic summary that shows where and when your attention is needed. Colored signals on the Visible Margin spotlight need for management action.

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Whatever your business . . . it can benefit from Remington Rand's 70 years of experience in analyzing and solving all types of business problems. Whether *your* problem involves Inventory, Production, Preventive Maintenance, Purchasing Accounting or Sales—Remington Rand experts can devise a Kardex System to answer your needs.

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E-31

# *She travelled 4,000 miles —alone!*

Not long ago, a little girl was entrusted to the care of a great air line. She flew across the ocean in a four-engined plane. For many hours she played, ate her meals and slept above the clouds. The next day she reached her destination.

Though she travelled alone, she was helped along her way— by the air line people, by fellow passengers and, yes, by the petroleum industry.

For wherever you fly along the airways of the world, your plane is serviced with fuels and lubricants made of petroleum. Esso is one of the leaders of the industry which has made these products as efficient and dependable as they are today. Because of research and constant study, tomorrow's air transportation will be even swifter, safer and more pleasant than it is now.

*Petroleum helps to build a better life.*

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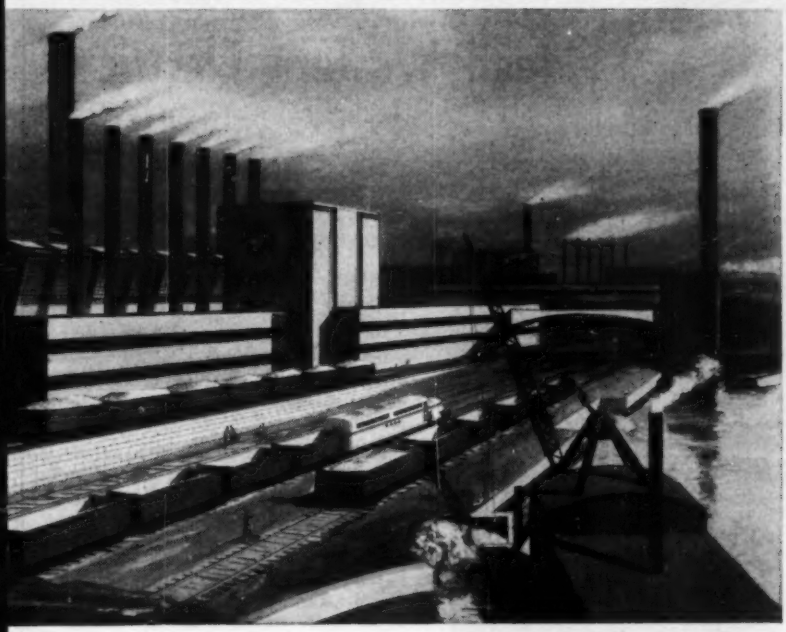

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## *Starts with Steel!*

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Allis-Chalmers also serves many other major industries . . . offers a wide range of products—with undivided responsibility for installation and service—for pulp and paper production, sugar, flour and cement making, mining and ore beneficiation.

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# 22 H-P-M's
## ..feed Western Electric's assembly line!

H-P-M injection machines molding Western Electric telephone parts.

### TWO HAVE BEEN ON THE JOB FOR MORE THAN 10 YEARS

It takes a lot of equipment to satisfy the world's appetite for telephones. Eighteen H-P-M injection machines mold plastic parts for Western Electric. Two of these H-P-M machines have been on the job over ten years—evidence of their performance and dependability.

Western Electric is one of hundreds of well known American companies molding plastics with H-P-Ms. Many European, British and South American manufacturers are using H-P-M injection machines with equal success. Typical users are Phillips, Int. Kunsthoorn, Gustavsbergs, B. X. Plastics, E. K. Cole, Halex, Brosserig Belfort, Belplastics, Trol, Paulista and Distenta.

You, too, can benefit from H-P-M's 73 years of hydraulic machine building experience. Whatever your plastics molding job . . . large or small . . . injection, compression or transfer . . . there is an H-P-M to do it quickly and profitably. Write for bulletins.

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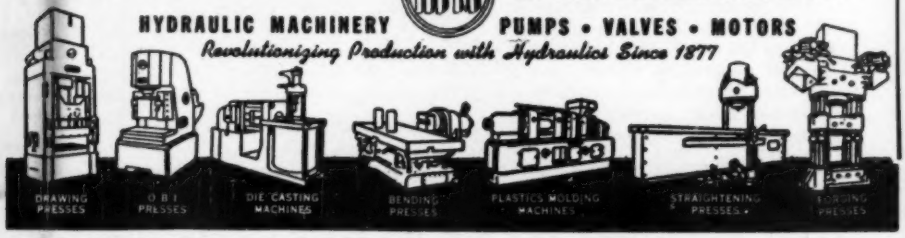


May 1951 • McGraw-Hill DIGEST • Volume 6 Number 5

*OPENED FEB. 16, this plant will help ease Puerto Rico's unemployment. Beacon Textiles, Inc.'s plant is typical of those Puerto Rico is building for new industries throughout the island.*

# Point-Four Pilot Plant

**Puerto Rico, although not a Point-Four territory, contains many lessons for those that are. Here is its story so they too may benefit from its experience**

TOO MANY PEOPLE and too little land prompted the Puerto Rico government to embark on an ambitious economical and industrial program.

Aside from its fertile soil and unemployed manpower, Puerto Rico has little natural wealth. This fact eliminates exploitation of the island's natural resources as a means of obtaining economic security. And Puerto Rico cannot support its rapidly growing population on an agricultural economy alone.

But the island is not without advantages. In the nearby U. S., it has a protected market for its sugar, rum, and needlework. And U. S. protection, preferences, and aid form an ideal basis for achieving economic security.

These advantages alone are not sufficient. Puerto Rico has the required leadership in government to carry through its program. Luis Muñoz Marin is the island's first elected governor. He is respected and trusted—the people back him. He has surrounded himself with able and conscientious men with one common aim—continued economic and industrial development.

Handling the program is the Economic Development Administration. Under this agency are groups in charge of promotion, tourism, research, and transportation.

Assisting EDA in the U. S. are two consultation firms: Hamilton Wright Organization, Inc., New York, and Arthur D. Little, Inc., Cambridge, Mass. The Hamilton Wright Organization promotes the advantages of manufacturing opportunities and attracts tourists to Puerto Rico. Arthur D. Little, Inc., assists businessmen and advises the government agency.

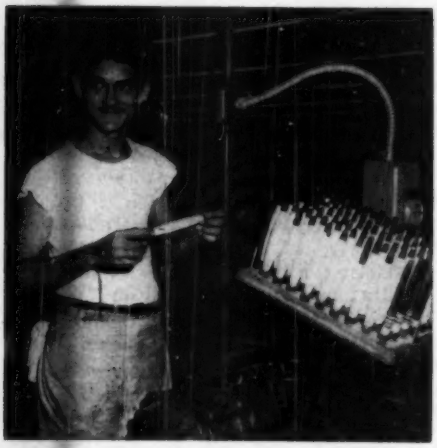
Some of the things that the EDA does

to attract business is to assemble facts and figures that will be of value to industrialists who might be looking to Puerto Rico for a factory site.

It provides them with facts about labor, taxes, markets, transportation, financial facilities, communications, power, water supplies, building and construction costs, insurance, trade marks, patents, copyrights, living conditions, and statistics on climate. Its various facilities are distributed through an industrial division, an engineering division, and an industrial-relations department to assist not only prospective manufacturers but also manufacturers operating on the island.

Functioning under the EDA is the Puerto Rico Industrial Development Company. PRIDCO's important activities are promotion, investment, and engineering.

This is what it does: It encourages U. S. industries to operate in Puerto Rico. It has the power to buy corporations, to construct plants for sale or lease, or to invest in privately owned organizations. As inducements, PRIDCO offers plentiful cheap labor, free engineering services, and important: tax exemptions.



***THIS PUERTO RICAN** had no previous experience before learning to weave at one of the new textile plants. He is trained on-the-job.*

## How PRIDCO Works

Here is how PRIDCO works: the prospective industrialist is shown the island in an attempt to locate the best site for his plant. Then, PRIDCO designs a building according to his requirements, builds it, and rents or sells it to him.

Building designs are made as simple as possible. Reinforced concrete is the main construction material. An average size structure costs about $6 per sq. ft. Local contractors usually do the construction, but occasionally PRIDCO erects a building to get a feel of prices.

The tax-exemption incentive permits full tax exemptions to be granted to "eligible industries". The exemption applies to virtually all taxes, including income, property and license taxes.

As it now stands, the tax exemption is to carry through June 30, 1959. At that time it will be done away with in four equal yearly decrements through 1963. Some form of tax relief for industry may be instituted before this present period ends. Wage earners on the island must pay a personal income tax.

All that PRIDCO expects is that new industries provide employment to some of Puerto Rico's chronic unemployed and provide assistance to the island's expansion program. So far PRIDCO has been most successful. As of March, 100 industries have been established on the island. Their products range from synthetic hormones to cement. More industries are scheduled to begin operations soon.

Most spectacular of PRIDCO's projects is the Caribe Hilton Hotel. This ultramodern 300-room showplace cost $7,200,000. Primary purpose of the hotel is to provide accommodations for industrialists who come to Puerto Rico to study the possibility of locating companies there. Puerto Rico's climate and nearness to the U. S. make it an ideal vacation land.

So tourists also make up a large percentage of the people staying at the Caribe Hilton. As a result, the hotel showed a profit of nearly $500,000 for its first 4 months.

Raised living standards, higher incomes will require better housing. Urban slums and rural shacks still house a large part of the population. Puerto Rico has attacked this situation with vigor. A plan is underway to supply land, materials, and concrete-block machines to poor country people. Three-room concrete-block houses costing $300 will be built. Government help, $20 down payment, and their neighbor's volunteered labor have so far put the first few families in new homes under this low-cost housing plan.

Other projects under way on the island include a new international airport and irrigation and hydroelectric installations. The airport will help make Puerto Rico an air transport center for North and South Americas. An island-wide sewerage program is being planned—but for the future.

### How Other Countries Benefit

Puerto Rico has had to depend mostly upon its own initiative in its drive toward a stable economy. It receives some help from the U. S. as a U. S. possession, but it is the self-help attitude of Puerto Ricans that will make their country self-sufficient.

Point 4 (see p22) countries and other countries will have to recognize that outside aid is not enough. They must step out and meet it part way. Puerto Rico has shown how to do it.

Government and government leadership must be capable and, most important. united in one purpose—economic development. Cooperation of government and private agencies is essential.

***HOUSING PROBLEM** is a tough one. Puerto Rico is solving it with low-cost concrete-block houses erected with volunteer labor.*

Again the aim is furthering economic development.

Some inducements to bring in outside investors will have to be offered together with a suitable business climate. Regulations that restrict trade and hamper increased industrial output will have to be abolished. Puerto Rico has pointed the way with its liberal tax laws and simple requirements.

Economic development is largely measured in terms of industrialization. Then each country must examine its industrial potential. Industries are chosen on the basis of how they can serve the development program. Aggressive steps should be taken to attract these industries. But it is a two-way proposition. A country must offer something to attract industry. It may be liberal regulations, cheap labor, good markets, or tax benefits.

The experience of Puerto Rico in its struggle for economic security provides a guide for Point 4 countries. It would be well for Point 4 countries to take note so that they may benefit from the lessons taught in Puerto Rico.

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***FRONT COVER**—Beacon textile plant supervisor is instructing a Puerto Rican in training as a warper-creeler hand.*

# U. S. Foreign-Trade Outlook

**Defense program of the United States is complicating its buying and selling abroad. Needed is a more workable, sensible policy**

WASHINGTON these days is full of foreign buyers and sellers, official and private, all looking for the answer to one question: What will rearmament do to U. S. foreign trade?

- Many raw-materials producers, like the Latin Americans who met at the Organization of American States meeting in March, are carefully controlling their contributions to the Western defense effort until they get an idea of how much U. S. production is going to be diverted their way.
- Industrial nations in the North Atlantic alliance are warning U. S. mobilization officials that unless they get more raw materials—and unless some stability in raw-materials prices returns—rearmament may be seriously hampered and unemployment may become dangerous.
- Under-developed nations are anxiously asking Washington for some assurance that scarce items will be kept available for important power and transportation projects now underway and for those of great political and economic value now being planned.

### Better Policy Needed

Most of the anxiety represents fear of what may happen rather than fear of what is happening. But that does not make the fear any less real. And until the U. S. comes up with more of a policy on buying and selling abroad, strains among the free nations will increase rather than decrease.

Raw materials—exporting and importing them—are giving Washington its biggest headaches. The problem is to find out how much each unit of the free world needs; what supplies are available; where new production can be brought in cheaply and quickly; and finally what each nation's quota is. This process is going on inside each industrial nation and on a world scale through the commodity committees of the International Materials Conference, (IMC), now meeting in Washington.

IMC committees have already been set up to study copper, lead, and zinc; cotton and cotton linters; tungsten and molybdenum; sulfur; wool; and manganese, nickel, and cobalt. (Rubber talks are going on outside of IMC.)

### How to Govern Allocations

The first job of these committees (besides exploring new production sources) is to establish a set of principles to govern allocations. What non-essential uses should be cut back? From what base period should consumption be cut back?

As the biggest consumer of practically everything, the U. S. position in each of these committees will have to be fixed before any progress can be made. And it was only in late spring that officials in Washington really began to tackle the problem. The Committee on Foreign Supplies and Requirements, headed by ECA Administrator William C. Foster and responsible to Defense Mobilization Administrator Charles Wilson, is working out the U. S. position.

Now that the administration's Controlled Materials Plan, which will determine the raw-materials consumption of most of U. S. industry, has been mapped out, the Foster committee may be able to come up with some policy. But it is likely to be autumn before IMC's deliberations bear any fruit in the way of allocation schemes.

Many specific situations are much too urgent to wait on this slow process of negotiation. Britain's need for increased

cotton and sulfur quotas from the U. S. had to be met by special action. Widespread unemployment in the big British textile industry would have interfered with British rearmament plans.

Nor is the U. S. waiting on international price-fixing schemes to do something about the prices it pays for imported raw materials. Prodded by an angry Senate committee, the government stopped buying tin for the government stockpile last March.

### U. S. Attacks Prices

Tin was short, but not short enough to pay $1.82 a lb. The price of tin dropped 41 cents in the New York market within 2 days of the order. The government is likely to take similar measures, where possible, with other commodities—particularly, rubber and zinc.

But without a war no officials believe that purely unilateral action by the U. S. will solve the raw-materials problem for more than a moment. The British cannot plan an effective rearmament program if every three months they face crises with the U. S. over cotton and sulfur supplies. The U. S. cannot stay out of any raw-materials market for long and still reach its defense production targets.

Part of the solution of the raw-materials problem will depend on what the U. S. decides to do about its exports. U. S. officials are fully aware that raw-materials producers these days are far less interested in dollars than in the supply of goods available.

### Weapon of Foreign Policy

Some U. S. officials are saying that exports will be the most effective weapon of U. S. foreign policy in the coming years. They predict that eventually Washington will be programming practically everything that exporters ship from the U. S., making sure that each shipment contributes in some way to the U. S. national interest.

This spring, in a report to President Truman on foreign economic policy, the International Development Advisory Board (with Nelson Rockefeller as chairman) called for such a policy. It asked that a new super-agency be established in Washington, responsible only to the President and having authority over all phases of U. S. economic operations abroad with the sole exception of trade treaties.

Rockefeller's board would not only make this agency responsible for the operations of Point Four, ECA, and the minor development programs. It would also make the agency responsible for all foreign claims on U. S. production, whether they be for raw materials which the U. S. controls or for supplies either of commercial exports or for development projects financed by World Bank or Export-Import Bank loans.

Rockefeller's argument, with which many officials in Washington agree, is that only in this way will foreign-policy officials in the government have enough power to keep essential export produc-

**Look For These To Happen In U. S. Foreign Trade**

- ▶ Raw-materials producers can expect to get goods in return for their materials, instead of dollars that may buy less later on.
- ▶ Critical situations, like Britain's need for cotton and sulfur, will be met by special action until the International Materials Conference works out allocation plans.
- ▶ The U. S. will attack extremely high prices of some commodities it buys, just as it did with tin. Possibilities are rubber and zinc.
- ▶ Exports will become the most effective weapon in U. S. foreign economic policy.
- ▶ One agency will be set up to have authority over all phases of U. S. economic operations abroad.
- ▶ More priorities will be issued for export orders that meet established requirements.

tion from drifting into a hungry domestic market.

The administration is going to put ECA, Point Four, and the minor development agencies under one agency. But top planners oppose going any further. They do not believe anybody can wave a magic wand and reorganize a sprawling bureaucracy overnight. That means for this year at least the Commerce Department will continue to act as claimant agency for all countries outside of Western Europe, with ECA acting for the latter.

By July 1, when the Controlled Materials Plan begins to operate, the government will have broad powers to direct manufacturers to produce for export. The plan not only dictates to U. S. industries just how much material each can have, but it also allows the government to dictate the end use of nearly all production. Within this framework, the government can, and probably will, program exports on a broad scale.

### Priorities for Export

The Commerce Department's Office of International Trade (OIT) is already doling out some priorities for export orders. Exporters are having no trouble getting priorities for scarce items in connection with strategic-material projects or other production abroad if the output is needed in the U. S. defense effort. Priorities are easy to get too for scarce items that contribute directly to the defense of a friendly power.

OIT next plans to issue priorities for maintenance, repair and operational supply orders abroad. These MRO orders are already being issued for domestic customers. Many manufacturers have complained that their spare-parts business overseas will be hurt badly unless they can put foreign customers too on a

OIT officials plan to extend these MRO priorities for export to include the supply of development projects already underway abroad. Some power and transporta- priority basis.

tion projects, often financed by Export-Import Bank and World Bank loans and which do not necessarily have a defense angle, are already being held up for lack of some key materials. Most officials believe the economic and political dangers entailed in letting these projects deteriorate are too great not to give such supplies a priority.

Finally, OIT will be giving priorities to exports "which will help maintain the basic economy of a friendly power." So far, defense mobilizers in Washington have treated applications for a priority on these grounds most skeptically. They argue that as the domestic U. S. market has not been guaranteed its share of essential civilian goods yet, foreign orders for the same things should not be given a priority.

This problem probably never will be finally resolved. The conflict between domestic and foreign requirements for non-defense goods involves some fine distinctions and, of course, a lot of political pressure. But judging by the experience of the last war, the U. S. to the best of its ability will live up to its policy of "equality of sacrifice" for all the populations of the free world. This time, especially since the world is only on a half-war footing, the distribution of goods should be about the same. But it will be a painful process to eke out decisions on each and every specfic case.

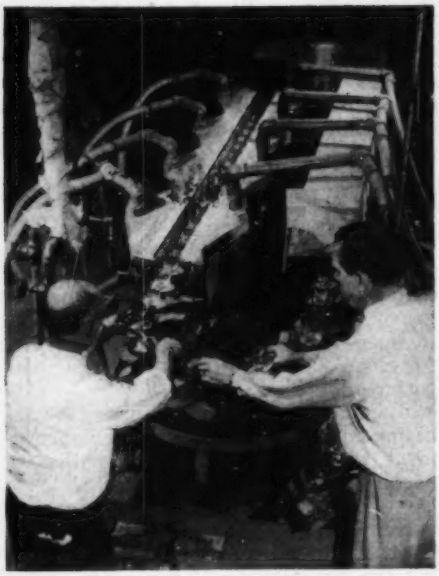
## Oil-Well Kickoff Bomb

Dead oil wells can often be "kicked" back to life. A new disintegrating chemical bomb for this purpose is now under development.

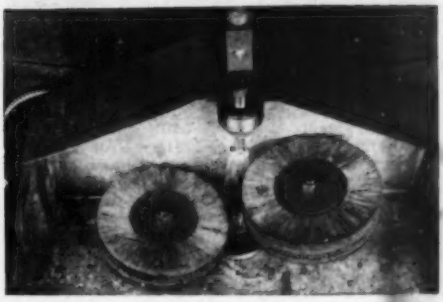
The bomb probably will consist only of oil-soluble or low-melting-point materials and gas-producing chemicals. The idea is for the bomb to release gas in the stagnant well. The gas penetrates the oil column, lightens the oil by mixing with it, and lifts the oil from the well by expansion both within and below the liquid column.—Oil & Gas J, Mar 1,p27

# Decorating Glassware

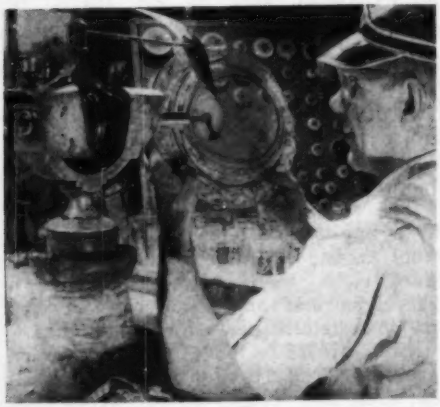
**Special machines at the Wm. A. Meier Glass Co. have greatly increased production in finishing operations on glassware.—Ceramic Ind, Mar, p74**



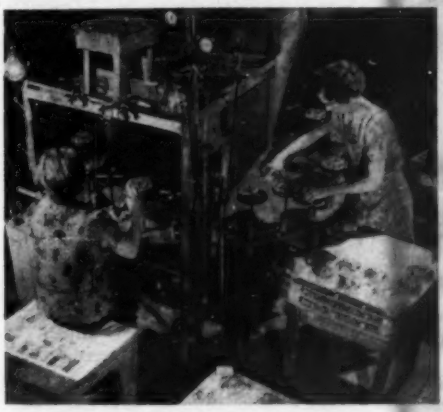
FLAME POLISHER polishes 7 days' decorating production in 1 day. Formerly 7 days were needed for 1 day's production. This is first use for decorative engravings.



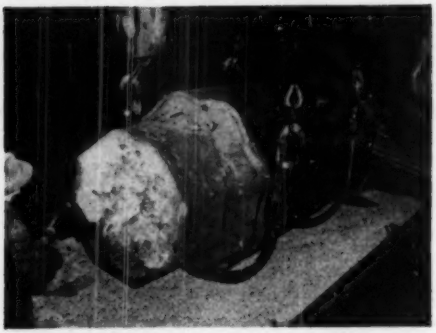
BRUSH POLISHER, a Meier development, is operated by three workers to produce in 24 hr. as much as 30 operators formerly could by using the hand-brush method.



ENGRAVING fine crystal glass in intricate design requires skilled workmanship and use of wide variety of different-size abrasive wheels (on rack in background).



SURFACE COLORING is applied to inexpensive glassware by semi-automatic spraying process. Topaz luster sprayed on ash trays fuse to glass when ash trays are heated.



**WHITE-HOT INGOT TRAVELS 200 MILES**

**Using vermiculite, a mineral insulation, Dominion Iron & Steel, Ltd., shipped a 65-ton white-hot ingot a distance of 200 mi. Traveling in a box on an ordinary railroad flat car, the ingot reached its destination at a temperature of 1,575° F., a loss of only 195° during the trip. Normally, 6 weeks are required to cool the ingot before shipping. Then, it would take 10 days to heat it back to a workable temperature. Nearly 2 months working time is saved.—Business Wk, Jan 27, p24**

## Precision Picker Knock-Off

Picker knock-off developed at Southern Regional Research Laboratory produces successive laps of identical yardage. If you are interested in laps of exactly the same length, this device will provide them. Here is how it works:

Yardage metering is based on the circumference of the lap calender roll. Attached to the calender-roll shaft is a driving disk provided with equally spaced indexing holes. A crank, mounted on this disk, can be rotated to any index hole for setting up 2¼-in. increments of lap length.

A tripping, or releasing, plunger is manually adjusted to meter the required yardage by locating a stop pin in the proper hole. Rotation of the calender roll actuates the plunger, which releases a catch and shifts the picker belt when the cycle of yardage is completed.—Textile World, Feb, p153

## Completion Methods Improve in the Petroleum Industry

Gravel packing, gas lifting, and formation-stimulation improvements featured completion methods for the last year in the petroleum industry.

▶ Gravel packing of wells experienced three changes: (1) Gravel size is 0.020-0.060 in. in dia. (2) It was discovered that gravel could be squeezed through casing perforations, thereby making the gravel pack in such casing as feasible as in open-hole completion. (3) The need for clean fluids in gravel placement was better appreciated.

▶ Minor improvements were made in gas-lifting equipment, but the major improvement resulted from closer attention to performance of the individual well. Now being developed is a method of changing valves without pulling the tubing.

▶ Attention has been directed to increasing the productivity of low-permeability reservoirs. The percentage of successful jobs with Hydrafrac has increased. Success also has been reported on use of the Strata-Lift. This technique employs a high-viscosity acid as the fracturing agent.—Oil & Gas J, Feb 15, p79

## Cylinders Absorb Test Noise

The deafening blast in engine test cells can be deadened effectively by banks of acoustical tubes, according to the manufacturer, Janke & Co.

The sound-absorbing units are made by wrapping Fiberglass TWF insulating wool around a center cylinder of hardware cloth, then enclosing that in a Fiberlgas mat and outer case of corrosion-resistant, perforated aluminum.

Units are 7½ ft. long, 9 in. in dia. Each provides 17 sq. ft. of perforated acoustical area and weighs 20 lb. Aluminum caps seal the ends and are provided with studs for suspension. The units are hung independently with no contact between them.—Aviation Wk, Mar 5, p25

## Plastic Refractories Form Monolithic Floors, Walls

Developed originally as a patching agent for furnace linings, plastic refractories are now employed to build complete monolithic enclosures as well as suspended arches. They are made of fire clay, flint clay, alumina, silica, chrome, kaolin, and other materials.

These refractories come in plastic moldable form. They can:

1. Confine the combustion process and its products.
2. Control and direct heat flow.
3. Prevent air leaking into furnace.
4. Resist erosive and corrosive effects of combustion products.
5. Develop strength at high temperatures to resist upsetting force.
6. Expand and contract freely with temperature changes.

When a wall or section is built with plastic material, the furnace is initially fired at a low rate for a number of hours to set the refractory. The hot face on an extensive area is usually scored every few feet to allow expansion and contraction.

The refractory panel is usually tied to the supporting outer brick wall or steel structure by anchors. For high walls, brackets fastened to the boiler steelwork or brick wall support the panels.—Power, Mar, p109

## Precision Pouch Maker

A compact pouch-forming, -filling, and -sealing machine, made by Bartelt Engrg. Co., packages moldable plastic powder to within ±½ gram.

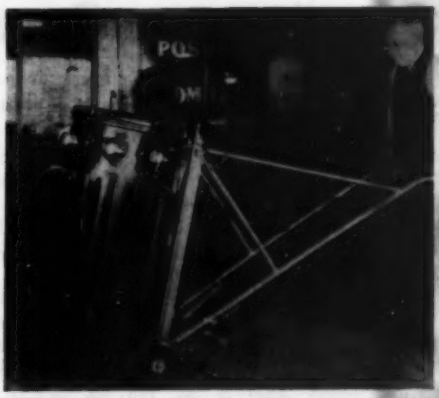
Pre-printed foil-Pliofilm-paper web is fed into one end of the machine. The web is folded over, and sides and bottom are heat-sealed and then cut off at the next station prior to being filled. Clamps on each side carry the pouch through the machine. A blade slides down vertically into the top of each envelope, for a pre-opening, and then the blade is withdrawn.

The next station in the operation fills the pouch with 21 grams of powder by means of a precision auger.

Next, the package moves between two compression blades that squeeze out air and finally a heat sealer seals the top of the package.—Mod Packaging, Jan, p91

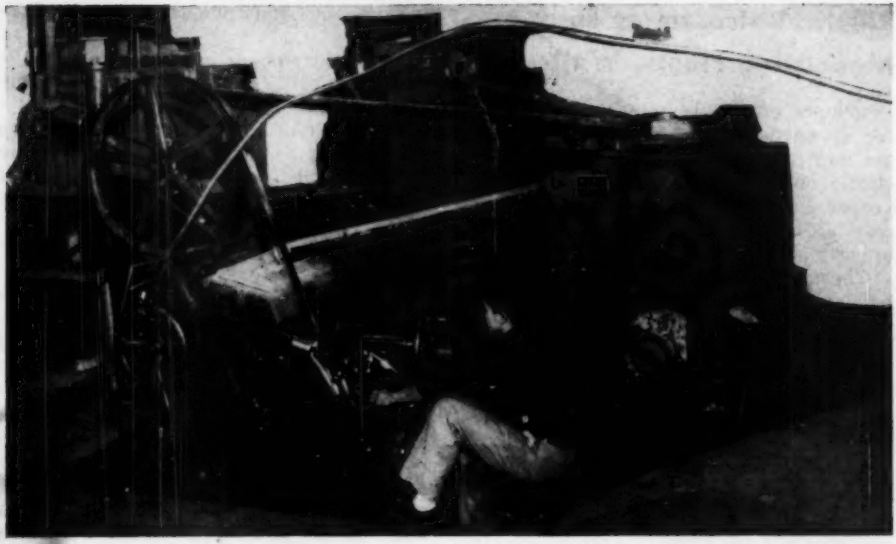
## How Big Can Presses Be?

No one knows the answer to that question. The top limit is not yet in sight. During the last war, Germany produced airplane spar-cap forgings in a 30,000-ton (metric) hydraulic press. The Russians got that press when the war ended. The U. S. Air Force is now doing experimental work with several large presses, ranging in size up to 15,000 tons (metric). In addition, 25 new presses in sizes up to 75,000 tons (U. S.) will be in operation within a year in the U. S.—Am Mach, Mar 5, p148



MOVES TRANSFORMERS UPRIGHT

**Modified handtruck can move transformers up to 50 kva. without spilling the oil because transformer stays in upright position. Chain on truck hooks under a lifting lug. Kick stand holds truck in upright position when not in use. Drums or other full containers could be moved safely the same way.—Elec World, Feb 26, p94**



*MOLTEN ALUMINUM from three furnaces is continuously cast in this Properzi casting machine; the rod then loops back over the operator on its way to the first pass of the rolling mill*

# Continuous-Cast Aluminum Bars

**Continuous casting is producing aluminum rod at 10 to 30 ft. per min. Three men operate both casting machine and rolling mill**

ALUMINUM BARS of high purity have been successfully cast with a continuous process by Nichols Wire & Aluminum Co. The casting machine was designed and built by Ilaro Properzi of S.p.A. Continuus, Milan, Italy.

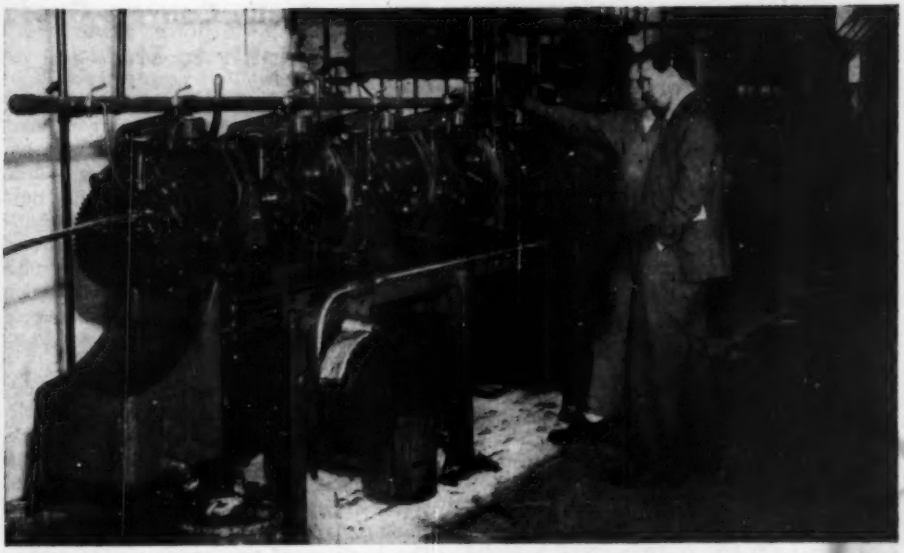
The machine, in operation since last July, casts an equilateral triangular section $\frac{7}{8}$ in. on a side. The cast section is then fed into a 15-stand continuous rod mill, which also is of Italian design. Rolled rod in coil form is later cold-drawn into various wire sizes.

The casting machine is an extremely simple device, consisting basically of two revolving drum wheels and a steel band. The band passes over the wheels and serves as one side of the mold cavity that is cut in the copper rim of the bottom wheel.

The copper rim is a casting bolted to the inner steel hub. Water circulates inside the hollow hub section of the wheel, and the lower part of the wheel is immersed in a tank of water. Cooling of the cast metal is therefore rapid.

The lower wheel revolves at $1\frac{1}{4}$-$2\frac{1}{2}$ rpm. during casting. Speed of casting is governed by the $\frac{1}{16}$-in. orifice of the spout that leads from the holding ladle to the junction of the steel band and copper mold. The molten metal is fed into the mold cavity tangentially and in a downward direction.

Metal is melted in three Ajax tilting furnaces. Two furnaces feed the third,



***CONTINUOUS ROLLING MILL** takes bar from casting machine, runs it through 15 stands of three-roll design, and delivers rod in coils to receivers at the end of the mill*

which serves as a holding unit. It pours into the main trough that feeds the hot-metal reservoir, or ladle, mounted on the casting machine.

Pouring temperature at the melting furnaces is 1275–1285° F. Runout troughs are not heated. The holding furnace pours at 1220–1240° F. Solidification is fast because of the rapid heat extraction by both the water inside the wheel and the water in the outside tank.

Casting speed and machine tilt are adjusted to produce optimum casting rates and section control. An oil film is run onto the outside of the steel band opposite the point at which the metal is fed into the mold. Speed of casting is regulated according to the oil evaporation pattern formed on the outside of the band.

The cast section travels with the wheel to a point part way up the side opposite the operator. The section is stripped and then loops back over the operator's position into the first pass of the rod mill.

The only scrap regularly encountered is at the beginning and end of a run or when improper feed causes a break in the section. While Nichols operates only 8 hr. a day, around-the-clock operation is practical.

The triangular section of the cast bar was chosen for two reasons. First, it is the simplest to extract from a wheel mold. Second, this shape is the best section for the three-roll rolling pass design of the continuous mill.

The mill, which is 28 ft. 8 in. long, is driven by a 50-hp. motor. The top roll of each roll cluster at each stand is connected to the drive shaft by a sprocket-chain drive. Each stand has a single gear reducer to control roll speed; speeds at each stand cannot be individually varied. Screwdown pressure on each stand can be adjusted only by moving the roll housings in or out on the main frame.

Each pass has three rolls. Odd num-

bered passes roll the bar to a round section, while even numbered passes roll it to a triangular section. Rolls are set at 120° to work the corners alternately. The designers thought that if the bar were made a square section, the mill would have to be much more complex.

The geometrical shape progression of rolling was chosen so all main shafts of the stands could be horizontal. Any other arrangement would require both horizontal and vertical shafts to avoid angular torsions or twists to the bar.

Rolled rod is coiled at the end of the mill. Coil weights average 225 lb. The surface of the rod is clean as an air blast blows off the oil lubricant as the rod leaves the finishing pass. The finish is considered to be much better than that on rod made by conventional rolling methods.

Macrographs of the as-cast sections show a relatively fine crystalline structure. Occasional small center cavities may form in the section, but they should be eliminated by better direction of metal flow into the mold.

Rolling to finish size also eliminates any porosity that may exist in the as-cast section. The finished rod is exceptionally sound and fine grained. Mechanical and electrical properties are satisfactory. Major end uses are for nails and manufactured wire products.—Iron Age, Feb 15, p87; Feb 22, p71

## Short Cut Figures Volumes

Here is a short cut for figuring the amount of cubic yards of concrete in walls or floors. Multiply length by width or height, and divide the result by the number below according to the thickness of wall or slab.

For a 3-in. wall, divide by 108. For a 4-in. wall, divide by 81. For a 6-in. wall, divide by 54. For an 8-in. wall, divide by 40.5. For a 10-in. wall, divide by 32.4. For a 12-in. wall, divide by 27. For a 18-in. wall, divide by 18.—Am Builder, Mar, p50

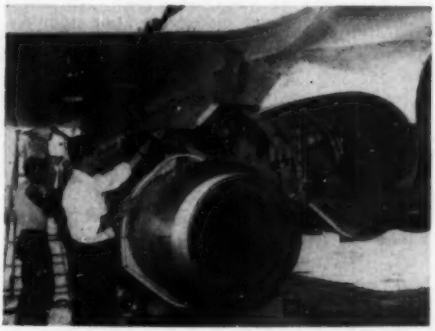
## Automatically Conveys Goods From Assembly to Storage

One conveyor system takes the varied output of three assembly lines from final assembly to the merchandising area, automatically and without mixup. This is a labor-saving feature of the new Western Electric Co.'s plant in Indianapolis.

The system: (1) saves extra conveying equipment that it would take to move the products separately over the distance; (2) minimizes space required for conveyors; (3) saves maintenance.

Positive indentification of each product is maintained throughout, and simplified packaging is the result of automatic segregation. As the cartons travel upward on the vertical conveyors, automatic sprayers mark them with a ¾-in. black dot of electrically conductive paint. The location of this mark on the carton is the key to the identity of the contents.

All the cartons move on the overhead



CHECKING THE SCORPION'S POWER

Rapid accessibility to Northrop F-89 Scorpion's Allison J-35 power plants is shown above. The "swing-out" installation is a distinct maintenance aid. Cowlings are quickly removable, and the location of the engine permits ground-level handling. A built-in hoist, actuated by the F-89's hand hydraulic pump, provides the power for returning the engines to operating position.—Aviation Wk, Jan 22, p17

belt conveyor to a spiral wheel conveyor. It lowers the cartons by gravity through the floor to another belt conveyor that runs along or near the lower level ceiling. The spiral allows easy descent without taking up much room.

On the lower level, the second belt conveyor carries the cartons through a battery of electric-contact finger selectors. Each selector is adjusted to pick up the black dot in one location on the carton side.

When a mark appears in the area of sensitivity of a selector, it actuates pneumatic rams that guide that carton off the belt onto one or another set of spiral wheel conveyors.

At the lower end of each spiral is a packaging station. Here the cartons, feeding by gravity to an operator at the base of each spiral, are packed in containers for storage or shipment.—Factory, Mar, p80

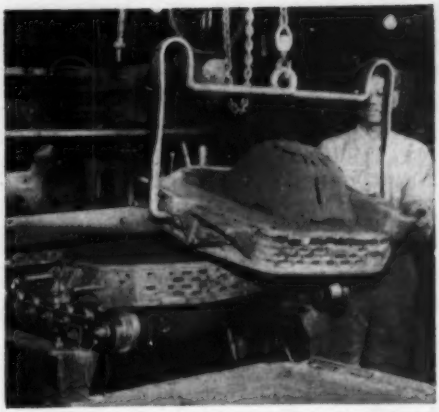
## Aluminum Matchplate Frame

Improved type of matchplate frame, developed by Cooper Alloy Foundry Co., is cast as a solid one-piece aluminum frame and is reinforced with ½-in. steel wear strips. Changes of matchplate inserts can be made in 20 sec.

The frame does not have to be removed from the flask for change of patterns. The operation requires only a half turn of four eccentrics with a screw driver either to remove the pattern or to lock it securely in place.

The inserted plates may be aluminum, wood, or plastics. Plastic-covered plywood is the most satisfactory material. It holds accurate dimensions, is light in weight, and serves as many molds as aluminum because the flask rides on the frame instead of on the insert.

Advantages claimed for the frame include elimination of all loose bench work, better short-run casting, longer pattern life, cheaper pattern inserts, and rapid switch of matchplates.—Foundry, Feb, p194



HOW TO SPEED UP MOLDING

**Drag halves for casting Buick Dynaflow transmission bell housings were formerly made in roll-over machines at a rate of 50 per hr. Rate is now 120 per hr. on an Osborn jolt-and-squeeze machine. Drags come out in inverted position and are rolled over in the ball that transfers them to casting conveyor. Basket-like steel framework supports the green-sand core.—Iron Age, Mar 1, p110**

## Practical Lubrication Tips

Whether your plant bakes beans or molds buttons, take these steps when you buy lubricants: (1) select lubricants required for each machine and estimate annual consumption; (2) try to reduce variety of lubricants kept in stock; (3) guide the purchasing agent.

One large plant, for example, stocked 900 drums and 80 different types of lubricants. There were even 12 bbl. of elevator guide-rail grease—enough to run the two plant elevators for many years. Careful study reduced assortment to 12 types meeting all needs. Inventory was cut to one-sixth its original size as a result of the study.

Aluminum Co. of America also attacked this problem. A stock of over 850 different lubricants was reduced to 150. —Oper Eng, Mar, p22

## *Mechanical Engineers' Handbook*

Completely revised fifth edition of Mark's Mechanical Engineers' Handbook brings you over 2,200 pages of data in every branch of mechanical engineering. Whether you are looking for information on aeronautics, combustion, refrigeration, power, or any other of the many subjects that make up mechanical engineering, you will find it in this handbook.

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Mechanical Engineers' Handbook ($15.00 a copy) is published by the McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York 18, N. Y., U. S. A.

## World Business Briefs

**Detroit businessmen:** Forty-five of them are going on a tour of Latin America. The object: a firsthand look at "the economic and political situation" there.—Business Wk, Feb 24, p147

**Guns for Cotton:** Under a new trade deal with Spain, Pakistan will get $200,000 worth of arms and ammunition, plus textiles and machinery. Pakistan will send cotton, hides, and jute in exchange.—Business Wk, Feb 24, p147

**In South America:** Ray-O-Vac Co. will set up a dry battery plant at Sao Paulo, Brazil. Burroughs Adding Machine Co. wants to locate an assembly plant somewhere in Brazil. Chemical Construction Co., an American Cyanamid subsidiary, is building a $500,000 sulfur benefication works for local interests in Colombia.—Business Wk, Mar 10, p131

**In South Africa:** The government is pushing a $50-million scheme to extract oil from coal. M. W. Kellogg Co. will act as consultant and contractor for an oil-from-coal plant to be erected by South Africa Coal, Oil & Gas Corp. at Coalbrook.—Business Wk, Mar 17, p146

## Reduces Pig-Iron Sulfur

Sulfur content of iron is reduced by a new process at the Domnarvet Iron Mills in Sweden. The process utilizes coke, but the final product is claimed to be equal in quality to Swedish charcoal pig iron.

The iron flows from the blast furnace into a basin of 12-ton capacity. From there it is tapped into a roller furnace driven at 34 rpm. Burned lime in the proportion of 2% of iron weight plus some coal dust are added to the furnace.

Sulfur decreases to the desired level within ½ hr. When tapped into the roller furnace, the iron contains 0.09% sulfur. Final sulfur content is only 0.005%.

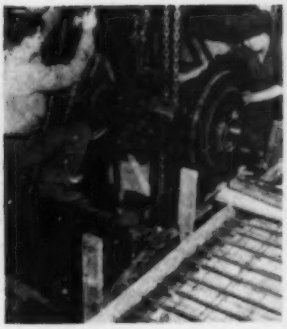
Sulfur and lime form calcium sulfide. The oxygen released unites with silicon to form silicon dioxide, thereby considerably reducing the silicon content.—Mach, Feb 24, p 291

## Cheap Way to Paint Tanks

The problem at Fairchild Aircraft Co.'s plant in Hagerstown, Md., was to repaint a 300,000-gal. water tank—36 ft. in dia. and 40 ft. high. To save money, engineers got together and came up with the idea of installing a "runner" on top of the tank. The runner pivots at the top center and can be pushed around the circumference on wheel supports at will. A swing or a bosun's chair is hung from the boom.—Factory, Mar, p134

*TRUSSED FRAME of stairway is fitted in opening. Next . . .*

*WORKMEN fix brackets that carry balustrade. Then . . .*



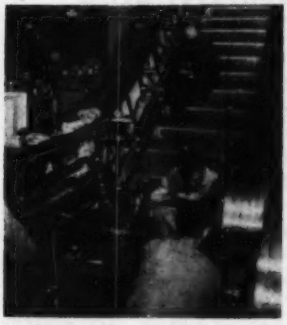
*SPROCKET with motor is lowered into place, and the . . .*

# How To Plan Moving Stairways

WHERE TO PUT moving stairways is the first decision. They should be installed where traffic is heaviest and where convenient to passengers. In stores, moving stairways should lead to sales areas.

In new construction, adequate space should be allotted, and sufficient structural steel or reinforced concrete should be provided to support the stairway. Existing buildings should be carefully studied to determine the necessary alterations. At the ends of the stairway opening, structural members must be designed to support stairway end reactions plus floor loads. A vertical variation of $\frac{1}{8}$ in. is permitted in the elevation of supporting beams from the specified floor-to-floor height.

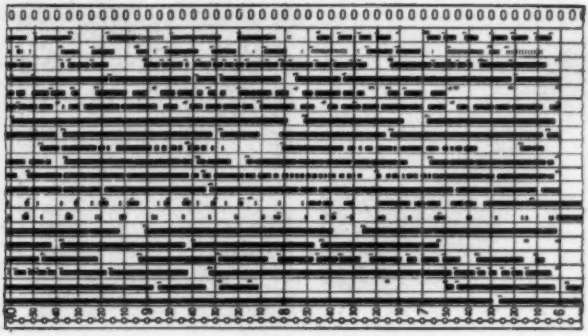
When required, fire-protection devices may be included in the stairway installation. They may take the form of rolling steel shutters that are electrically or manually operated to close a stairwell. Or a combination exhaust system and sprinkler system may be installed.—Eng News-Rec, Mar 1, p30



*COMB PLATE and floor pans are set at top of stairs. Later . . .*

*BALUSTRADES are attached and steps installed. Finally . . .*

*STAIRWAY is completed with addition of handrails and panels.*



OPERATION RECORDERS HELP MAKE TIME STUDIES

A mechanical recording device manufactured by L. M. Ericcsons, Sweden, coupled to a group of machines can tell what machines are stopped, when, why, and for how long. Stoppage causes are each assigned a number. When a machine stops, the stoppage-cause number is dialed on the instrument on the left. The impulse is transmitted from the dial to a central recorder, and the number of the stoppage cause is imprinted on the tape. Typical record tape for 20 machines (right) shows operating time (black lines), length of stops (blanks in lines), and stoppage causes (numbers). Record tape is continuous. Data can assist in making time studies, promote quality control, improve supervising efficiency, and give data for planning and costing.—Textile World, Mar, p134

## Instruments Readily Keep Accurate Foundry Records

As certain foundry records must be kept, Ferro Machine & Foundry Co. has wherever possible installed recording instruments to eliminate the human variable and to obtain unbiased data. Such installations have promoted better labor-management relations.

Sand-mixer operators, for example, are paid on number of daily batches. Recording ammeters show what the mixers are doing at all times—how many batches, whether half or full batches, and even whether proper amounts of ingredients are used.

Downtime on conveyor systems also is recorded by instrument. Recording ammeters are connected to driving motors so power on-and-off conditions are recorded continuously.

In cupola operation, a continuous record is kept of both the amount and pressure of air supplied; cupola-charge weights are recorded automatically on tape. Other records made by instrument are of core-oven baking temperatures and time; indoor and outdoor temperatures for use in the engine room; and pressure of compressed air delivered to various foundry departments.—Foundry, Mar, p108

## Low-Cost Conveyor Drive

New conveyor drive developed by National Iron Co. can reduce installation and maintenance costs of heavy belt conveyors. The drive has an overhung driving pulley that eliminates need for conventional head shaft and bearings as well as the low-speed coupling or chain drive.

The design employs a special Westinghouse speed reducer equipped with extra large pinion shaft for the overhung pulley. On the first installation made—a 1,075-ft. conveyor with a 30-in. belt—overhung load was 28,800 lb. Net saving on installation costs were $8,000.—Steel, Feb 19, p72

## Chromium Salvage Practical with Two New Processes

Scarcity of chromium makes more important than ever the recovery of chromium-containing ions from anodizing, electroplating and copper-stripping baths. Two processes have been developed for this purpose.

The process developed by Pfaudler Co. concentrates chromic acid by evaporation and is most suitable for chromium plating baths. It concentrates the wash water, which contains 1-6 oz. of chromic acid per gal., to plating strength of 30-50 oz. of acid per gal.

Evaporation is carried on in a glass-lined still. About 8 hr. are needed to concentrate the solution. Four sizes of evaporating units are available—200, 300, 500, and 1,000 gal. Larger ones can be built.

The second process was developed by Mutual Chemical Co. chiefly for anodizing baths. It is an ion-exchange method. Sulfonated cross-linked polystyrene cation exchangers remove the metallic cations (aluminum and chromium) from used chromic acid solutions.

Thus, it is no longer necessary to dump anodizing baths. A small part of the bath is treated each day to yield a constant, optimum bath concentration for anodizing. Used resin is regenerated with sulfuric acid.—Chem Ind Wk, Mar 3, p21

## Fish Frozen Continuously

Two continuous freezing towers at North Pacific Frozen Products Co. reduce the temperature of 1-lb. packages of fish to 0° F. in 75 min.—less than 2 hr. after filleting. The operation is continuous, and labor costs are lower than with batch processing.

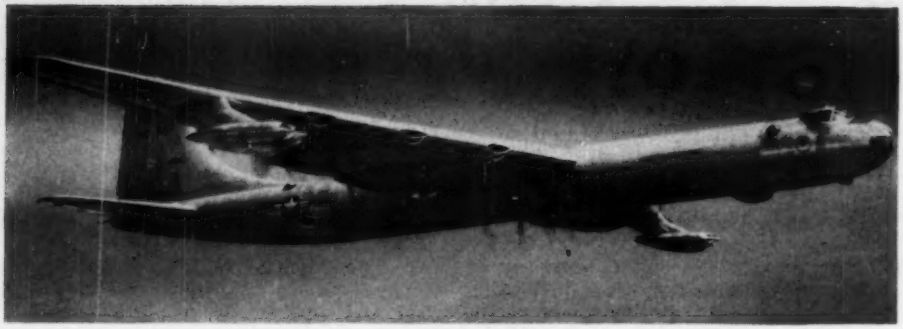
Packed cartons are placed on an unusual 40 x 35-in. galvanized freezer tray with a false bottom. Between false and true bottoms is a 1¼-in. air space broken only by Z-support forms.

The tray is inserted into the bottom of a tower, which holds 40 trays in all. The tray is carried up through the freezing tower to the top and ejected by a hydraulic ram to an elevator that lowers it to a waiting truck for transfer to storage.

Cooling in the tower is done by a fan driving air over finned refrigerator coils and on through the radiator sections of the upper trays at 1,200 fpm. The air then circulates down through the lower trays and back to the fan. Air temperature is from −25° to −30° F.—Food Ind, Mar, p96

**MOLDED PLASTIC TOWEL HOLDER**

**One-piece molded polyethylene towel holder grips the corner of a towel, allowing it to hang in a neat, loose drape for faster drying. The towel can be put in place with only one finger, and is removed by pulling on it. The three gripper flaps will not break, cannot tear the material, and will always return to their proper position after the towel is removed. The holder is manufactured by A. J. Ganz Co.—Mod Plastics, Mar, p76**



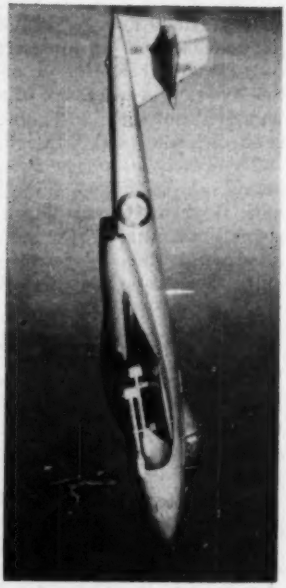
Consolidated Vultee B-36D—Latest model includes 4 axial-flow turbojets mounted in pairs under each wing to give additional power for higher service ceiling and speed boost.

# Aircraft Around the World

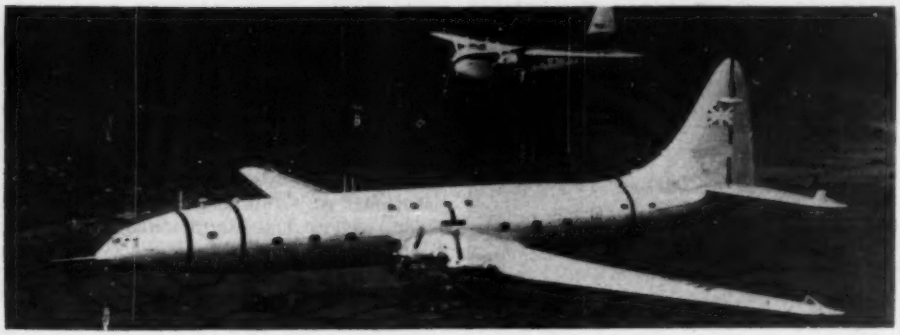
**Here are some of the newest aircraft in the world. Some are military, others commercial, all employ latest in design techniques.—Aviation Wk, Feb 26**

English Electric Canberra Mk2—All-weather fighter-bomber is designed for tactical support. Two Curtiss-Wright-built Sapphire turbojets will power U. S. version.

Texas A&M Ag-1—Flying farmer is designed specifically for spraying, dusting, fertilizing and seeding. Spray tank storage is in thick wings. Pilot has excellent view.



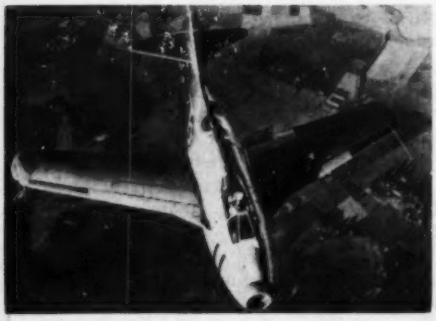
Gloster Aircraft Meteor 8—Fighter has top speed near 600 mph. Range is 800 mi.



Bristol Brabazon 1 Mk.1—Commercial passenger-type plane has 8 aircooled engines working in pairs to drive 4 contra-rotating propellers. Second model will be turboprop powered.

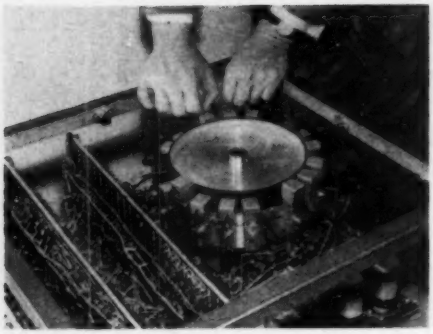
Avro Canada Jetliner C-102—Powered by 4 turbojets, the C-102 will permit lower operating and maintenance costs.

Piasecki HRP-2—Transport-type helicopter features troop seats and litter installations for assault or rescue work.



Swedish Saab-29—Flying laboratory has thin, swept-back wing and is designed for over 625-mph. speed with turbojet.

Grognard SE2410-01—French jet fighter has 2 engines mounted one above the other. Air intake is atop fuselage behind nose.



*REVOLVING DRUM, on which 10,000 numbers can be stored, is the nerve center of . . .*

## Industrial Digital Computer

Magnetic-drum digital differential analyzer developed by Northrop Aircraft, Inc., can do the work of scores of mathematical experts, yet is only the size of a desk. Most computers of this kind require ten times the space and are not portable. The Northrop computer, in fact, is regarded as the first differential analyzer small enough for practical industrial application.

It has been designed to perform, among other duties, in conjunction with various instruments, to control machinery and processes. It can evaluate information, make decisions, and control valves, thermostats, tank levels, flow rates, and the like.

Accuracy is one in 100-million. Cost is remarkably low—from $30,000 up to $100,000. It has less than 100 tubes and only one moving part, the magnetic "memory" drum.

The drum is the nerve center of the computer. It can store up to 10,000 numbers and use them when needed in the complicated equations that the machine can solve. The numbers are reported on the drum through electronic pulses. The computer requires little time to set up as compared with other machines.—Prod Eng, Mar, p152

## Economy and Steady Service Determine Electrical System

Distribution economy and flexibility plus service continuity feature the new A. B. Dick Co. plant near Chicago. Two 33-kv. overhead circuits feed the outdoor substation. A 4,160-volt, 3-phase primary loop enters the plant through underground fiber conduits.

To economize on copper and reduce power losses, the 4,160-volt primary radial feeders originate at air circuit breakers in the switchgear and distribute power to one double-ended and six single-ended unit substations located at load concentrations throughout the plant.

Secondary ties between six substations ensure service continuity. Should a primary feeder or substation transformer fail, load on the affected unit can be transferred quickly to another substation.

Secondary 480-volt power is carried throughout the manufacturing area by 400-amp., 3-phase bus duct circuits with conduit drops to machines. Most electrical equipment is of standard type, except in the solvent building where power and lighting systems are explosion proof.—Elec C&M, Mar, p80

## Two New Military Trucks

Now in production at the Fort Wayne Works of the International Harvester Co. are two trucks for the U. S. Army Ordnance Corps. Model M-41 has a cargo body and model M-51 has a dump body. Both are 5-ton 6 x 6's.

Outstanding features of the trucks are:

• Ability to perform satisfactorily at temperature ranging from —65° F. to 125° F.

• Ability to ford streams up to 6½-ft. deep with the engine running completely submerged. Two extension pipes make this possible. One is for air intake to the engine, the other for exhaust.

• A two-speed transfer case (McG-H

Digest, Dec '50, p28) provides automatic means of engaging the front-axle drive.

A 6-cylinder valve-in-head engine, delivering 224 bhp. at 2,800 rpm., powers the trucks. Compression ratio is 6.4 to 1.

In designing the M-41 and the M-51, emphasis was placed on interchangeable parts and simple maintenance. Radiator, engine, and transmission can be removed as a unit without draining any liquids.—Auto Ind, Mar 1, p37

## To Prevent Paint Failures

A special committee at Seattle, Wash., has been studying the widespread paint failures in that city. The committee has recommended these changes be included in the Seattle building code:

1. Eliminate gas-tight building paper that causes condensation inside the siding.
2. Extend roof flashings 3 ft. up the roof.
3. Install gutters below the ends of the shingles and 1 in. out from the building.
4. Provide proper flashing at ends of gutters.
5. Seal the soil to prevent moisture from entering houses.
6. Cover mudsills with asphalt-impregnated paper.
7. Make sure that there is proper ground drainage around and under the house.—Eng News-Rec, Mar 1, p8

## Adding Fungal Enzymes Helps Make Better Bread

Greater loaf volume, improved crumb characteristics (softness and no sticky crumb), better dough consistency, reduction of "buckiness" in doughs by increasing their mobility during fermentation, and regulation of amylolytic and proteolytic activity are gained by adding fungal enzymes to bread dough.

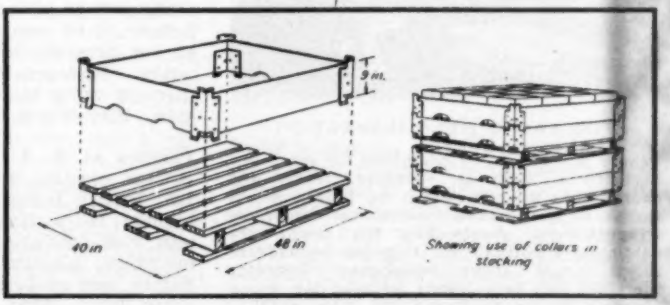
Enzymes can be added at the bakery as a dry, concentrated powder, as tablets dissolved in water, or in a less concentrated form with an inert diluent such as starch. Cost is probably no more than that of supplements now commonly added.

Action of the enzymes is to convert starches to dextrins and sugars and to change certain linkages in the gluten structure. These changes are desirable because the sugars cause a more vigorous fermentation and modifications of large starch and protein molecules result in improved loaf characteristics in the baked bread.

Enzymes added are the starch-liquefying alpha-amylase, the protein splitting proteinase, and beta-amylase. The latter stimulates partial breakdown of starch molecules by removal of maltose from the non-reducing end of the chain. Maltose is then utilized by yeast during fermentation.—Food Ind, Mar, p80

### COLLARS VARY CONTAINER DEPTH

**Pallets at Vauxhall Motors, Ltd., at Luton, England, are fitted with collars to provide containers of any depth. Collars are interlocking at the four corners. Collars can be removed as container is emptied.—Mach, Feb 17, p221**

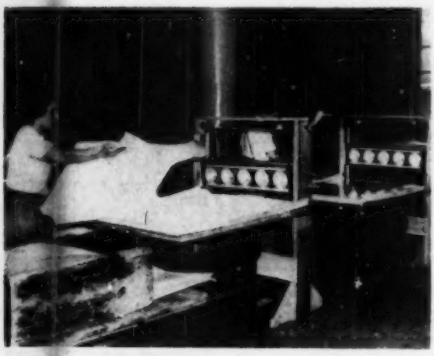


# Technical Shorts

**New Enamel for Aluminum** — Enamel needs no special metal preparation except single tank treatment. It is fired at 1000°F., can be repeatedly quenched from 800°F. without damage, can cover sheet or dense castings. With special ground coat, it can cover steel at low temperatures.—Ceramic Ind, Mar, p97

**Quick Stops on Ice**—A recent test conducted by U. S. National Safety Council indicates that steel tire chains are far superior to special winter tires for fast, safe stops on icy roads. In fact, some winter tires proved inferior to conventional tires.—Fleet Owner, Feb, p79

**Gas-turbine Blades**—British gas-turbine manufacturer has made gas-turbine blades of titanium carbide in nickel or cobalt matrix. They have proved successful in 100-hr. running test. Blades were finished by sintering and run in the as-sintered condition—Mach, Mar 3, p328



FOG LAMPS HELP INSPECTION

Where paper is to be examined for small imperfections, such as wrinkles, tears, and spots, light source should be highly directional to give three-dimensional effect on irregularities. Automobile fog lamps are particularly suitable for this job because of sharp cutoff above horizontal. Operator therefore can face lamps without too much glare in his eyes.—Paper Ind, Feb, p1170

**Man-made Whirlwinds**—Powder, such as for insecticides, is ground in a micronizer in the Micronized Products Dept. of Pittsburgh Plate Glass Co. Compressed air or superheated steam is mixed with powder and spun around a 24-in. cylinder to grind powder to 5-micron dia., which is 1/10 the diameter of a human hair.—Chem Ind Wk, Feb 24, p26

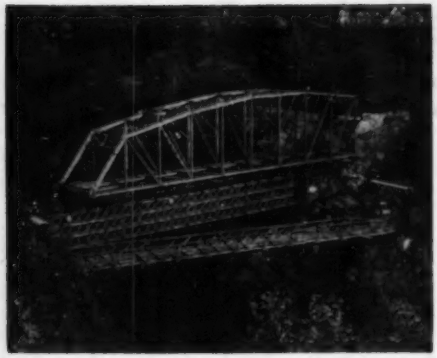
**Super-hot Torch Flame**—Fluorine offers fabulous possibilities in various processes if it can be controlled. Here is one: A fluorine-hydrogen torch has a flame so hot that it can cut copper, a feat that previously was almost impossible because the copper would conduct heat away before it melted.—Weld Eng, Mar, p65

**Conveyor Helps Build Dam**—A 7-mile long belt conveyor is moving 4-million tons of mountain across two valleys to the site of the Bull Shoals dam in Arkansas. The belt runs at 525 ft. per min. on 14,000 rollers and carries 650 tons of crushed rock per hr.—Power, Mar, p142

**Automobile Plant in Israel**—Kaiser-Frazer Corp. has completed a new automobile and truck plant in Haifa. The plant will employ 300 persons and will turn out 20 cars and 5 trucks a day. Present plans call for all parts and raw materials to come from the U. S. Later, Israel factories will provide 15% of the basic materials.—Auto Ind, Mar 1, p20

**Keeps Oil Dry**—Southern Oxygen Co. minimizes water contamination of transformer oil by feeding surplus dry nitrogen at low pressure into tops of transformer tanks. Nitrogen is allowed to escape through vents to reduce pressure on gaskets.—Elec World, Feb 26, p122

**Plastics at B. I. F.**—The full range of British plastics will be featured at the 1951 British Industries Fair. Exhibits will include fabrications and extrusions, casein, new insulating materials, cushioning materials, plastics jewelry, emulsion for paints, new embossed p.v.c. sheeting, and other items.—Mod Plastics, Mar, p124



BAILEY BRIDGING SPEEDS ERECTION

Erection of the Anlow Bridge over the Skeena River, near Hazelton, B. C., presented quite a problem. The site chosen was near an existing 190-ft. suspension span of timber frame towers and stiffening truss, with safe loads reduced to 5 tons gross. At this point the Skeena River flows through a narrow defile. It was impossible to erect in the normal manner using a timber pile trestle. A Bailey bridge was feasible because it could be transported across the old suspension bridge in light loads, could be launched conveniently from the approach fill, and would be 100% salvageable after erection was complete.—Eng News-Rec, Mar 8, p48

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**Arsenic Increases Life**—A small amount of arsenic added to the lead sheaths of underground electric cables will increase their life. According to University of Illinois, the poison cuts down stretching and consequent cracking of the covering, permits higher pressures for insulating oil in the cable.—Business Wk, Mar 3, p82

**Modern Prospecting**—Mond Nickel Co., British affiliate of International Nickel Co., will prospect for nickel in Tanganyika. Some 1,120 sq. mi. will be covered by air detection methods.—Iron Age, Mar 1, p11

**Saves Heating Steam**—Application of 2 in. of mineral wool cement, trowelled on in three layers, to ends of cylindrical paper-drying rollers is saving steam at Standard Asbestos Mfg. Co. Two coats of aluminum paint over the cement improve appearance of the roller ends. —Paper Ind, Jan, p1079

**New Cutting-tool Material**—New material, primarily of aluminum oxide, has been developed as an alloy in making cutting tools to machine super-hard metals and for applications in high-temperature melting of such metals. Another possible use is mixing metal and ceramics for use in jet-aircraft parts. U. S. Air Force Research Laboratory developed the material. —Am Mach, Feb 19, p117

**Free Coffee Sells**—With $6 for coffee, $2.40 for cream, and $9 for doughnuts, Edwards Jewelry Co. in Kankakee, Ill., sold 16 automatic coffee makers at $32.50 a piece in 1 day. Such promotion is carried out for 2 days, then stopped for a while. Advertising preceded the free-coffee days.—Elec Merch, Mar, p55

**Clearing Trees**—The bulldozer operator should watch for falling limbs. In the case of pines, if the whipping action is too great, the top may snap off and kick back on to tractor or operator. As tree starts to fall, dozer should be backed up quickly to prevent roots kicking up under the blade or tractor.—Const Meth & Equip, Feb, p60

**No More Shale Oil**—Australia has decided to abandon its 10-year effort to produce oil economically from shale in New South Wales. Reason: production costs are too high. Each gallon cost the equivalent of 49 cents.—Oil & Gas J, Feb 22, p137

**Boxes Made from Straw**—Developed by the U. S. Northern Regional Research Laboratory, the straw box board is expected to substitute for wood veneer now used in making wire-bound shipping containers. The new board comes in standard thicknesses and can be worked in standard box-making machines.—Railway Age, Feb 26, p47

**Reduces Jerk-ins on Loom**—Jerked-in filling can be lessened on Draper looms by drilling a hole in the front box just to the right of the opening for the thread cutter. Pack the hole with waste, allowing the waste to extend ¼ in. on the inside of the box. The waste will hold the filling in place for the thread cutter to pick it up. —Textile World, Feb, p190

# New Catalyst Refining Process

**Higher octane yield, conservation of crude oil, and alternate use for aromatics production are advantages of Atlantic's new process**

FOUR YEARS of concentrated research have ended with the announcement by the Atlantic Refining Co. of a new catalyst reforming process. Chief benefits claimed for the process are improved fuel quality, greater conservation of crude resources, and alternate application to aromatics production.

The Atlantic process promises flexibility and shows impressive yield and octane performance on the basis of pilot-plant operation. The first commercial unit is now under construction at the company's Philadelphia refinery and should be in operation within a year. Capacity will be 11,000 bbl. of naphtha charge a day.

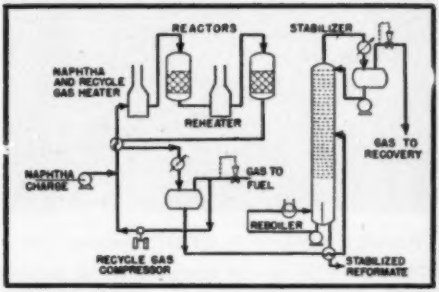
The process will employ a preheat furnace, two or more reactors, and facilities for reheating the hydrocarbon stream between reactors. Reformate from the final reactor vessel preheats the naphtha charge, is cooled, and then is passed to a separator vessel.

Condensed liquids, comprising propane and heavier, are withdrawn as stabilizer charge. The stabilized reformate is then ready for blending. Separator gas, composed of 97-98% hydrogen, is compressed and recycled with fresh naphtha charge in a 10.1 ratio. Excess hydrogen is withdrawn as fuel.

The catalyst, in fixed beds in the reactors, is in the form of small pellets containing platinum. It provides the proper control of hydrocarbon reactions to promote isomerization and dehydrogenation and to suppress undesirable cracking.

Isomerization upgrades straight-chain paraffins to higher-octane iso-paraffins and converts cyclopentanes to cyclohexanes. The latter are readily dehydrogenated to benzene and other aromatics.

What little cracking takes place occurs




***FLOW CHART** of catalytic reforming process shows processing but not facilities for regeneration of the pellet-form catalyst*

near the center of the paraffin molecule, resulting in extremely low production of light ends. In mild reforming on naphtha, production of methane and ethane can be held to 0.2% of the fresh charge.

The Atlantic process differs from others in providing for periodic regeneration of catalyst in place and, when necessary, without interruption of over-all plant operation. When carbon deposition on the catalyst reduces activity, the reactor is bypassed; conditions in the remaining reactor or reactors are adjusted to compensate for the reactor taken out of duty.

Regeneration takes place at process pressure. The circulating stream comprises less than 1% of oxygen in an inert gas. Complete carbon burnoff proceeds smoothly at 950-975° F. A commercial-size reactor should be regenerated in 8 hr., and a complete turnaround made in less than 24 hr.

Frequency of regeneration depends on severity of operation. Under normal conditions of reforming average naphtha for octane improvement, no regeneration should be necessary. Under severe oper-

ation conditions, regeneration may be required every 6 weeks.

The process was developed in pre-Korea days to meet the growing demand for upgrading low-octane naphtha to get high-quality gasoline blending stocks. But the present mobilization requirements for aromatics now make the process of double importance. It offers 88% conversion of naphthenes to benzene without recycling.

The new catalyst will be manufactured by Davison Chemical Co. A single charge for the three-reactor 11,000-bbl. unit will be about 25 tons.—Oil & Gas J, Feb 22, p129

## Liquid Vinyl Seam Sealer

Colorless liquid vinyl permanently seals and water-proofs seams in vinyl wall covering. Manufactured by Pantosote Co., the sealer is strong enough to create a bond as tough and as durable as the top coat of the wall covering itself.

In addition, the seam sealer prevents buckling, bulging, and bending in the wall covering when moisture gets under the seams.

To use, the liquid is spread lightly on the seam with an ordinary brush. In 5 min. at room temperature, the sealer is dry and the seam permanently sealed.—Mod Plastics, Mar, p138

## Work Simplification Program Includes All Plant Workers

Work simplification by everybody is recommended for the company that wants to save man-hours and materials. The Maytag Co. went about cutting costs through work simplification in this manner:

**First,** they installed a good suggestion system. Employees made suggestions when they were paid for them. Competition was one of the things that moved operators to submit ideas.

**Second,** a condensed training program for supervisors was set up. They were taught fundamentals of work simplification and the purpose of the employees' suggestion plan.

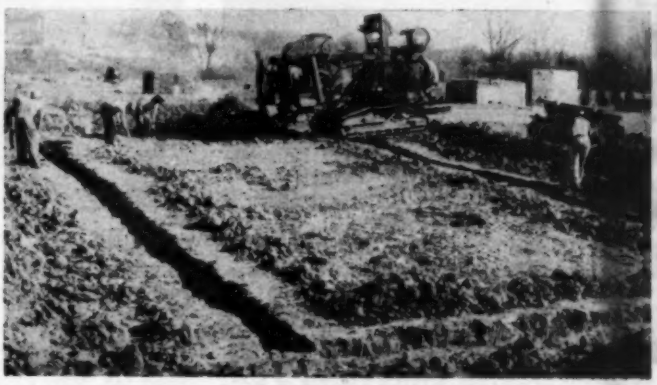
**Third,** Maytag presented the program to the employees through the local union officials. The officials were asked to criticize the plan and make improvements on it. Cooperation of the union was unanimous.

**Fourth,** workers were trained from one department at a time. Workers in each department were allowed to submit ideas as soon as all workers in the department were trained.

**And fifth,** the company did not let the program die. It kept it going.—Factory, Mar, p122

### ELIMINATES FORMS

**Vertical-loom ditcher digs foundation trench to width, line, and grade so concrete can be poured directly into slot without forms. Plank across trench, for inside crawler, lets rig make square corners. In 30-45 min., machine cuts complete 16-in. trench 30 to 78 in. deep for buildings up to 27x87 ft.—Const Meth & Equip, Mar, p42**



## Iron Ore Direct-Reduced in Pilot-Plant Operation

Direct reduction of iron ore is now an accomplished fact in the pilot stage. H. A. Brassert & Co. developed the process.

Direct reduction is simply the extraction of oxygen from the ore. Previous attempts were made by blowing atomized gas through a powdered ore bed, making it fluid. This worked fine until reduction was 70% completed. Then the ore bed froze and uniform contact between gas and ore was no longer possible.

Brassert overcame this condition by converting the fine ore into baked pellets. As the pellets are round and porous, the reducing gas can circulate through them.

Reduction of a descending column in a vertical shaft is done under atmospheric pressure at 850-900° C. in about 60 min. Under 41-psi. pressure, reduction is completed in 8 min.

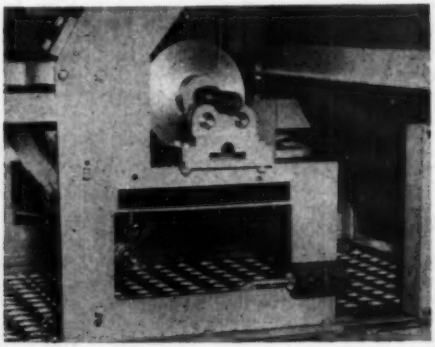
Reduced pellets can be used in pellet form as charge stock in electric or open-hearth furnaces. If used as feed stock, they must be briquetted to form a heavy, solid stock that will penetrate the slag layer.—Iron Age, Feb 22, p93

## Cable-Sheath Corrosion

Studies by Chicago's Commonwealth Edison Co. have resulted in two new methods for cathodic protection of underground cable sheath.

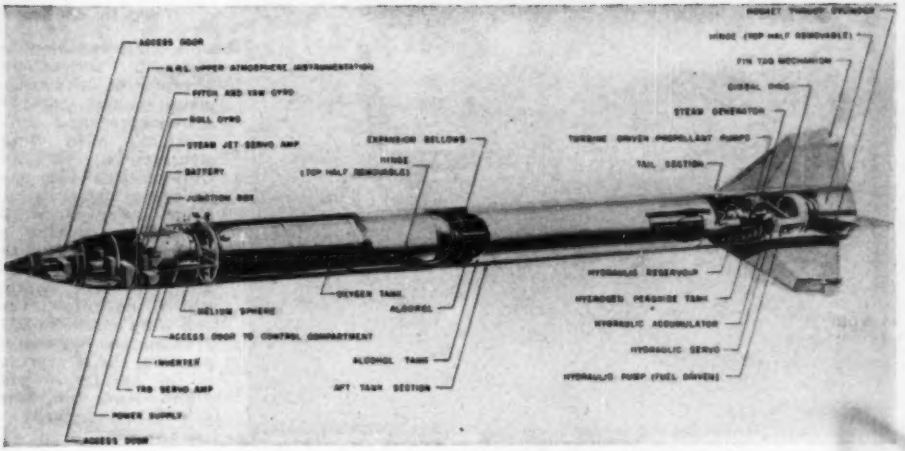
The first method is to use a jacket over the lead sheath of all cables in new installations or for replacements. The second is to protect non-jacketed cables in the anodic areas by employing a rectifier to force current through the earth from an "anode" cable to the network cable sheaths.

This anode cable is a used cable placed in a lower duct. It raises the earth potential in the vicinity of the cable run, thereby providing cathodic protection. This method is flexible because the anode cable can be extended to cover new areas. The rectifier operates on 120-v. ac. and has 18 taps for changing secondary d-c. voltage. It delivers about 5 amp. to the anode.—Elec World, Feb 26, p87



**MASS-PACKAGES FREE-FLOWING DRY FOODS**

New machine built by Mason-Keller Corp. stamps pockets in roll-fed aluminum foil (left), fills them with dry food products (right), places another sheet of foil over the filled bottom sheet, and then forms 24 heat-sealed packets at a time. The company is packaging 2½-g. cup-serving packets of soluble coffee at 675 per min. This method is a radical departure from conventional operation that calls for repeated handling. This new single-operation machine can handle yeast, bouillon, sugar, salt, soluble tea, milk powder, and other powdered food products.—Food Ind, Mar, p102




INSIDE U. S. NAVY VIKING TEST ROCKET

**Navy specifications called for a vehicle capable of carrying a payload of from 100 to 1,000 lb. to altitudes of over 100 mi. The cutaway, above, is the first released of the interior arrangement of the Glenn L. Martin Co's test rocket designed to the Navy's specifications. It is rocket-propelled, using liquid oxygen as the oxidizer and alcohol as fuel. The engine, located in the tail section, is gimbal-mounted and moved, by servos, to steer the rocket while power is on. The fourth firing of six successful flights was at sea from aboard a converted seaplane tender. —Aviation Wk, Jan 15, p24; Jan 22, p33**

## Cast-Steel Homogenization

Homogenization heat treatment, which is a high-temperature anneal, is used in the steel foundry to eliminate segregation existing in cast steel. Because of various uncertainties regarding its use, research was conducted at the University of Wisconsin to determine its effectiveness on steels 3140, 4342, and 8642.

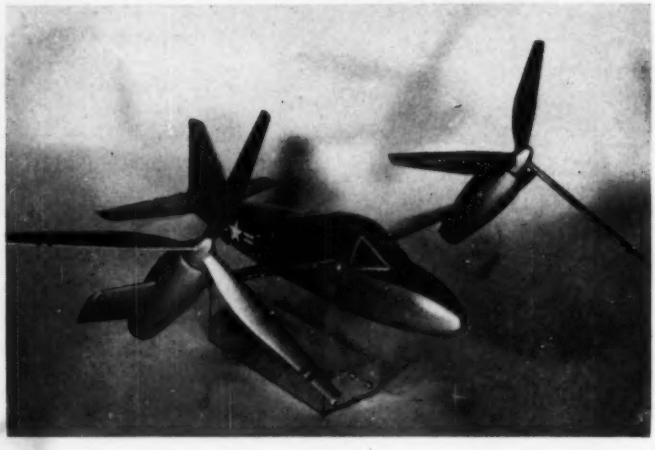
Property changes of most importance affected by homogenizing were the hardenability and the yield-tensile ratios. For average-size castings, such benefits would probably not warrant the severe homogenization treatment necessary to accomplish appreciable alloy diffusion. But for heavy sections, increased hardenability and better ratios would warrant the treatment.

Experimental results indicated also that steels of higher alloy content are more adversely affected when cast into heavier sections. Severe homogenization is probably worthwhile for such steels.—Foundry, Mar, p100

## Detergent Washes Smoke

Hydrocarbon fumes from plant exhaust gases can be removed by water scrubbers, but emulsions often form from the light gas oil fractions and clog up the washing system. Adding a detergent to the wash water not only licked this problem in Trumbull Asphalt Co.'s plant but also provided 75% of the plant's fuel requirements.

The detergent is Oronite Chemical Co.'s D-40. Its presence allowed gas oil to be recovered from the scrubbing water and reduced exhaust smoke by 90%. Some of the gas oil is burned in the plant, and the balance is sold. Fuel purchases of 25,000 gal. per month have been cut 75%.—Chem Ind Wk, Feb 24, p25



**TWO IN ONE**

**This scale model of a proposed convertible aircraft or convertiplane (combination of a helicopter and conventional fixed wing aircraft) by Wayne University shows the helicopter operation stage. For forward flight, the rotor is tilted gradually with simultaneous movement of the wing. When the rotor axes and wing attain an approximately horizontal position, the aircraft is in the normal winged flight.—Auto Ind, Mar 1, p18**

## Discharge of Condensers Operate Stud Welders

Capacitor-operated stud welder, developed by Graham Mfg. Corp., can weld studs to quite thin parts of plated or painted metals. It also can weld dissimilar metals in combinations. The unit is available in cabinet or portable gun-welding models.

Neither stud nor metal plate needs any flux or special preparation. All low-carbon steels and most nonferrous metals, except lead, can be stud-welded readily. High-sulfur steels and occasionally high-carbon steels are difficult to stud-weld.

Condensers for storing welding current are charged by built-in motor-generator set; charging time is 0.4-0.8 sec. Control of current discharge is made by an electrically or pneumatically operated contactor that interrupts charging current and then closes the welding circuit. The same pushbuttons that actuate the contactor also control air to the welding gun.

Voltage required is 110, 220, or 440 volts. Air pressure must be 85-100 psi.

Automatic stud selection and feeding devices are available. With such mechanical aids, including indexing fixtures, as many as 3,000 studs per hr. can be set by one operator. Stud locations are maintained within 0.003-in. tolerances.—Weld Eng, Mar, p36

## Company Destroys Old Files

Company officials of a Midwestern concern decided it was time to clear out old records and set up some kind of retention period for other files.

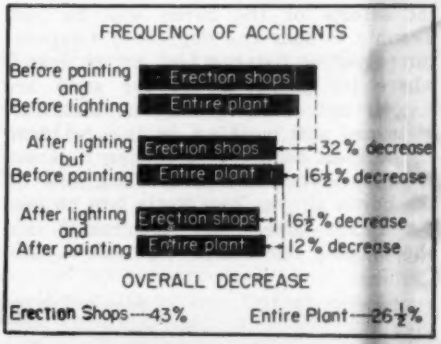
A list was made of every record. Recommendations for minimum and maximum retention periods were set up for some records, while other records were destroyed. Retention periods were based on legal requirements and needs of various departments.

Every paper left in the filing department was indexed with a location and destruction date. If, after 2 or 3 years, 5- or 10-year records are no longer requested by somebody in the company, their retention periods will be shortened. The company has now made it a rule to weed out its files once a year, and it is a simple matter of running through the index cards to determine which records can be destroyed.—Am Business, Feb, p19

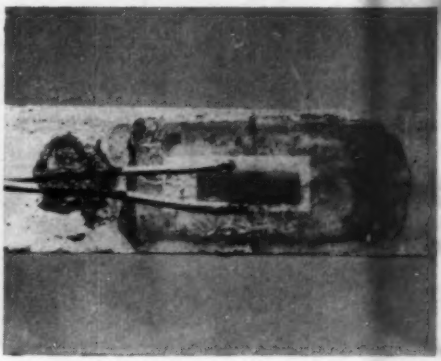
# This Month's How To . . .

**. . . step up efficiency** in a tile plant is demonstrated by one idea adopted at the Angeleno Corp.'s plant in Redondo Beach, Calif. Careful positioning of fettling tables is important in loading kiln cars with freshly pressed green wares for bisque firing. Tables are set at a 30° angle to press line. Rail line for kiln cars is parallel to press line. At each table, switch and spur allow moving kiln car alongside the table. Switches, covered by steel plate skirts, can be easily operated by foot. Mechanism consists of pivot pin and roller-bearing arrangement.—Ceramic Ind, Mar, p86

**. . . reduce plant accidents** is shown by this accident-frequency chart from Allis-Chalmers Mfg. Co. After relighting, accidents in erection shops dropped by 32% and in the entire plant by 16½%. Then after repainting, there were further reductions of 16½% and 12%. Other companies report similar results. A Chicago firm reports that new painting contributed much toward a 73% reduction in accident rate. Another company reports 75% fewer accidents, reduction in rejects, and 7–10% increase in production with color conditioning.—Elec World, Feb 26, p84




**. . . fasten electric strain gages** to concrete is the key to eliminating errors in strain measurements caused by improper bond. First, the concrete surface under the gage is ground smooth. A heavy coat of household cement is applied to the concrete. Next, some cement is placed on a piece of 0.01-in. thick celluloid. The celluloid is then firmly pressed against the treated concrete surface. After drying 24 hours, the film is sanded smooth, and the strain gage applied with nitro-cellulose cement. Hot wax is applied over the gage, and the concrete is lacquered.—Eng News-Rec, Mar 8, p46



## Addition of Boron to Steel Saves Scarce Alloying Metals

Now that strategic alloying metals are getting scarce, boron steel is being produced again.

A small amount of inexpensive and plentiful boron added to a heat of nickel-chrome-molybdenum steel cuts the required amount of alloying agents almost in half.

But there is a drawback. Boron's characteristics are unpredictable in a finished product. The steel calls for careful temperature control from the time it cools until it is made into a finished part.

If the steel is overheated in the furnaces or soaking pits, chances are that the effects of the boron will be lost. Trouble is that the degree of temperature at which boron is lost, or the degree where its properties in the steel are lost, is not definitely known. Metallurgists are still working on this problem.

The steel industry is getting together to work out standard specifications on the boron alloys. Test heats will be produced and after they are rolled into sheets and bar stock, automotive and agricultural parts makers will take over.

The parts makers will determine the difference between parts made of boron steel and those made of conventional alloys. Tests of the boron-alloy parts will show the differences in heat treating, tensile strengths, and elongation factors. Future heats based on these test results are expected to come closer to the requirements of the parts makers.—Business Wk, Mar 10, p69

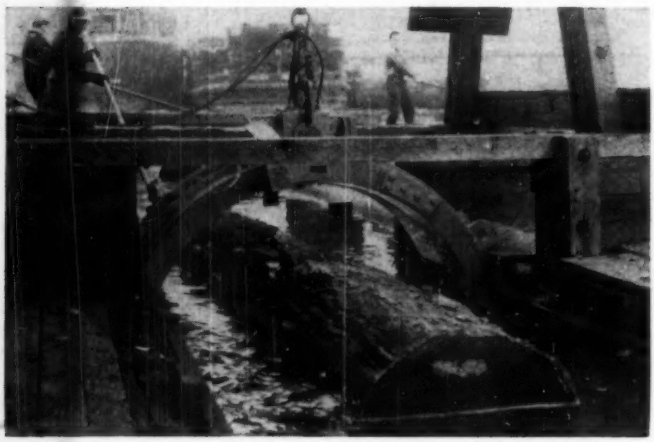
## Conveyors Speed Paperwork

More than 400 ft. of document conveyors have eliminated runners, smoothed out paper processing to a steady flow, and saved thousands of man-hours at Ducommun Metals & Supply Co. in Los Angeles.

Desks of inside telephone salesmen—about 40 of them—are staggered on either side of two parallel, 40-ft. long V-shaped conveyors.

Here is the procedure: After the salesman has taken an order and written it, he places it in the conveyor beside him.

The order travels to a typist who types a six-part order form and then deposits it on a conveyor. This conveyor travels to two credit authorizers. They check customers' credit, approve orders, and

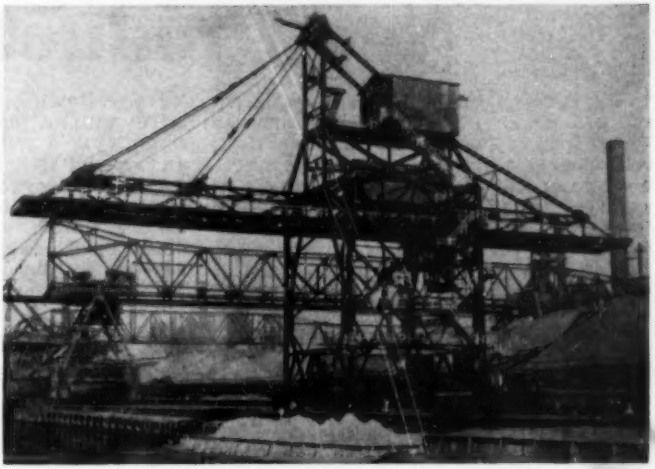


**DETECTS METAL IN LOGS OR ORE**

**Pair of large magnetic coils is used with General Electric metal detector to find tramp metal in logs up to 56 in. in dia. Alternating magnetic field gives any metal in log a magnetic dipole moment, which induces current in coils that can be detected as change in exciting-coil impedance. Similar setup can inspect iron ore.—Electronics, Mar, p88**

### ORE UNLOADER SAVES MANPOWER

**This 15-ton ore unloader, built by Dravo Corp. and installed at an eastern port in the U. S., can be operated by only one man. Unloader is carried on four 8-wheel trucks, one at each corner of the tower. Independent 45-hp. motors drive wheels. Hoist is operated by 250-hp. motor. Capacity from ship hold to storage pile is 1,100 tons per hr.—Elec World, Feb 26, p118**



send them on to the next department.

If the order is "Rush"—with a customer waiting at "Will Call" to pick up the item—the order goes by conveyor to Will Call to be processed immediately. If an order is not "Rush", it goes, along with duplicates, to stock records. From stock records, the order goes to the stockroom where it is filled.—Ind Dist, Mar, p78

## Turning Replaces Grinding

Carbide-tipped turning tools at General Motors' Chevrolet-Muncie Div. have replaced rough-grinding wheels for removing the 0.005-in. stock left on the transmission shafts at bearing fits for hardening prior to grinding. Stock is removed faster and with less tool cost.

Fay automatic lathes have been rebuilt to withstand the high spindle speeds necessary for the surface speeds of 650–990 fpm. Precision ball bearings were put on the spindles, and air-operated ball-bearing tailstocks in place of conventional tailstocks. Drive motors are now 15 hp., instead of 7½ hp.—Am Mach, Feb 19, p137

## Hot-Forms Aluminum Parts

High-strength aluminum-alloy parts are being hot-formed by Northrop Aircraft, Inc. Purpose is to save time over cold-forming method and subsequent heat treating and straightening.

Maintenance of temperature range is critical. For 75S-T6, a forming temperature of 300° F. produces best results. At this temperature, formability compares favorably with that of 75S-0 at room temperature. At 400° F., serious overaging takes place.

Heating is done by oil-bath immersion and electrical resistance. The oil bath should be held to ± 10° of 300° F. Forming tools also must be heated to about 300° F. to prevent chilling of the hot work when it comes into contact with the tools. Transfer of work from bath to tool should be as fast as practical.

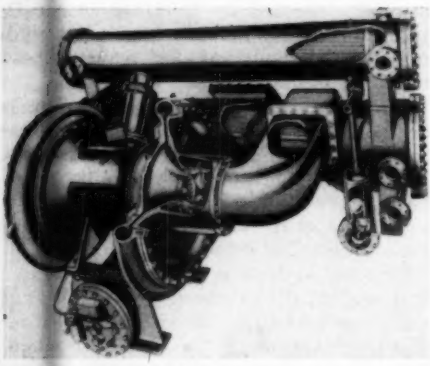
In electrical resistance heating, certain precautions must be observed to get uniform heating. The extrusion must be located properly in relation to the magnetic field. Parts must be of constant cross-section throughout. Contact areas must be clean.—Steel, Mar 5, p84

# New Products

**Types Better Letters**—Visual margins on typewriter makes balanced letters routine. Front writing scales assist in accurately centering headings and balancing short, medium or long letters on stationery. Six symbols enable typist to set visible margins for 5-, 6-, or 7-in. writing line.—**Underwood Corp.**—Am Business, Feb, p61

**Combines Hoist and Drill**—A simple adapter kit—requiring no special tools for mounting—locks a portable power drill and a winch into one power hoist unit. Hoisting capacity is 1,000 lb. at 10 fpm.—**Skilsaw Inc.**—Factory, Mar, p158

**Reduces Unit Pressure**—Plunger-operated valve reduces pressure in individual hydraulic unit without changing line pressure in the control system. Capacities of two models range up to 15 gpm. at 100-300 and 200-1,000 psi.—**Hydraulic Equipment Co.**—Prod Eng, Mar, p168



CHILLS REFRIGERATING WATER

New CenTraVac centrifugal water-chilling unit is designed for comfort and industrial air-conditiong systems. It employs first hermetic centrifugal unit intended for systems served by compressors of 45 tons or more of refrigeration. Freon F-113 is the refrigerant. Hermetic sealing eliminates shaft seals, a major source of gas and air leakage and compressor failures. Built by Trane Co., unit is available in five sizes—from 45 to 190 tons. —Power, Mar, p146

**No-burr Cutoff**—New machine cuts off a piece without leaving a burr, thereby eliminating a second operation. It uses an opposed spindle to grip and advance work. Two independent cross-slides, front and rear, carry toolposts furnished with circular forming tools. Capacity is ⅜-in. dia. Speed range is 454-5,000 rpm.—**Browne & Sharpe Mfg. Co.**—Am Mach, Mar. 5, p153

**Insulation Resin**—Geon 44 is a polyvinyl resin for wire and cable insulation. Sheets, rods, and tubing of various diameters can be made from it. Uses indicated are on weather-proof line wire, radio hook-up wire, navy cable and coaxial cable jackets. —**B. F. Goodrich Chemical Co.**—Elec World, Feb 26, p130

**Drives Vertical Pumps**—Gearturbo pump heads are designed to drive vertical-shaft pumps where electricity is not available or where natural gas, gasoline, diesel oil, or steam power is cheaper. Units are offered in nine sizes from 3-300 hp.—**Food Machinery & Chemical Corp.**—Oil & Gas J, Feb 1, p81

**Checks Frequency**—Model 6T-4 Stroboconn measures frequency to 0.05% accuracy. It is calibrated directly in cps. It is useful in aircraft engine work as well as in industrial frequency testing.—**C. G. Conn, Ltd.**—Electronics, Mar, p144

**Hydraulic Package**—Self-contained unit of pump, motor, and accessories may be employed as complete hydraulic system or as pilot system for large installations. Capacities range from 1.8-8.25 gpm. at pressures up to 1,000 psi. Motor sizes are ⅓ to 5 hp.—**Harco Industries**—Oper Eng, Mar, p64

**Hoist Has Two Hooks**—This double-hook hoisting unit will fit any size tub for handling loose materials. Hooks are regularly spaced at 48 in. apart, but can be adjusted for lesser distance. Hoist will lift 500 lb. at 25 fpm. or 250 lb. at 50 fpm. —**Flinchbaugh Co.**—Ind Dis, Mar, p140

**Blocks for Filter Beds**—Concrete blocks serve as floor for the filter bed in sewage-treatment plants. The blocks are strong enough (3,000 psi.) to support the load of a trickling filter while permitting seepage. First layer of rock in filter bed is made large enough to prevent sifting into the tile openings.—**Graystone Products Co.**—Eng News-Rec, Feb 22, p94

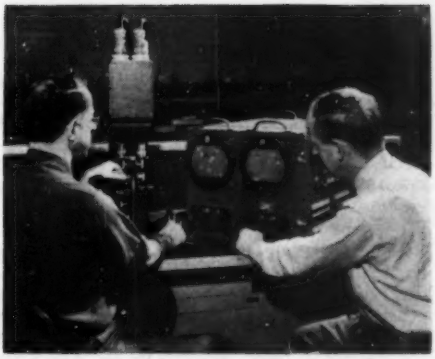
**Tool Recovers Broken Steel**—The Hole Saver may be used to reclaim lost bits and drill steel broken off in the hole and thus save redrilling the hole. Its special left-hand tapered threads cut into the metal of the broken rod and remove it quickly and easily without jamming.—**Rock Bit Sales & Service Co.**—Coal Age, Feb, p126

**Hot Belt**—Conveyor belting for materials up to 600°F. is made of heavy silver duck combined with asbestos and special insulating materials. It is intended for handling various hot materials, including hot castings and foundry shakeout sand.—**Imperial Belting Co.**—Foundry, Mar, p216

**Checks Sheet Thickness**—Portable gage quickly measures thickness of sheet or strip stock. Instrument has spring-loaded anvils controlled by retraction lever built into handle. Measurement is read on dial indicator in 0.001-in. increments. Indicator can be direct or continuous reading.—**Federal Products Corp.**—Prod Eng, Feb, p166

**Oscillating Granulator**—Welded stainless-steel granulator is claimed to have practically no leakage. Hopper part that seats screen has a long, accurate seat. Drive motor is protected against dust by mounting it within housing with only one end exposed for ventilation.—**F. J. Stokes Machine Co.**—Chem Eng, Feb, p164

**Protects Aluminum**—Brush-on kit contains sufficient chemicals to Alodize 1,000 sq. ft. of aluminum in shop or field. Process is designed to provide protection to both painted and unpainted aluminum surfaces against humid, salt-laden and industrial atmospheres. A minimum of equipment and skill is required to apply the coating.—**American Chemical Paint Co.**—Aviation Wk, Mar 12, p46



TELEVISION MICROSCOPY

**Range of light microscope is extended in new Radio Corp. of America system by a television link between microscope and human eye. It provides sharper contrast. Binocular camera unit employs two Vidicons, each sensitized to a different wave length. Equipment allows immediate viewing of living cells normally visible only after killing and staining.—Electronics, Mar, p142**

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**Engine Dynamometer**—Compactness and flexibility are chief features of new engine dynamometer. It can be adapted to gas or diesel engines and can operate with hp. ratings from 50 to 2,000 at various speeds. Loads may be increased or decreased, then re-established without affecting accuracy.—**Clayton Mfg. Co.**—Fleet Owner, Mar, p67

**Dye Resists Gas-fume Fading**—Selanthrene Violet BGF is designed for production of violet shades possessing high resistance to gas-fume fading on acetate rayon and nylon. Fastness to light, perspiration, crocking, and dry cleaning is good. Conventional dyeing equipment can be used.—**E. I. du Pont de Nemours & Co., Inc.**—Textile World, Feb, p176

**Engine-compressor Package**—SVG gas-engine-driven compressor is suitable for industrial, air, gas or refrigeration service, as well as in petroleum and chemical plants. Two sizes are 6 cyl., 330 hp. and 8 cyl., 440 hp. Controls and valves are grouped at operating end.—**Ingersoll-Rand Co.**—Power, Mar, p150

# New Products (Cont.)

**Portable Roller**—Unballasted weight of maintenance roller is 3 tons; water-ballasted weight is 5 tons. It can trail at normal truck speeds on its own rubber-tired road wheels, which are raised and lowered hydraulically.—**Shovel Supply Co.**—Const Meth & Equip, Mar, p116

**Preheats Plastics**—Very-high-frequency electronic preheater is suitable for handling 5 lb. of compound a minute. The preheater will heat a bulk load or heat compound on a loading-board for use with multi-cavity mold work.—**W. T. La Rose & Associates**—Mod Plastics, Mar, p117

**Tamps Ties**—Tie tamper is a self-contained gasoline-operated unit that imparts a high-velocity hammer blow through a spring-and-crank assembly. Tamper weighs 55 lb.—**Racine Tool & Machine Co.**—Railway Age, Mar 12, p76

TWO-FOR-ONE TWISTING SPINDLE

New two-for-one spindle adaptable to practically every make of up-twister for producing crepe has been developed by C. Landholt & Co., Zurich, Switzerland. Delivery bobbin is stationary; only a small part of the spindle revolves at given high speeds. From the yarn-unwinding device, yarn is led up to the inlet eye, down through the center of the bobbin, and to the outside of the spindle. On the outside of the spindle, the yarn forms a steady twisting balloon.—Textile World, Mar, p162

**Container for Dynamite**—Box for storing dynamite is useful for construction companies that must protect explosives from fire and deterioration on the site. It can hold up to 6 tons. Outside of box is welded steel, inside wood. The wood lining cuts down danger from sparks. Box is easy to ship.—**Dravo Corp.**—Business Wk, Feb 17, p69

**Farm Building Trusses**—Sturdy, low-cost trusses for farm, commercial and industrial buildings are prefabricated of Douglas fir and are factory-finished, ready for assembly. Trusses are furnished in sizes up to 50-ft. clear span with complete necessary hardware.—**Farm Building Service**—Am Builder, Mar, p134

**Speedy Wiring**—Three items—triple tap, flat tap, and cord splicer—have been added to Quick Clamp line. Cord is cut off square, slit, and inserted into side of device. Clamp is pressed shut. Internal contacts pierce cord insulation and make contact. Items are used on No. 18, 2-conductor rubber-, plastic-, or rayon-covered parallel cord.—**Monowatt Inc.**—Elec West, Jan, p30

**Dairy Dryer**—New milk-drying system consists of an evaporator to concentrate milk to 40% and a concurrent dryer. It is recommended for small dairies or as auxiliary equipment in larger plants for special items, such as chocolate milk.—**Swenson Evaporator Co.**—Food Ind, Mar, p153

**Motor Totally Enclosed**—Line of Type OZE squirrel-cage motors, which are totally enclosed, now includes 7½-hp., 1,800-rpm. and 5-hp., 1,200-rpm. units. Ball bearings have ample grease space to allow sealing for life of bearing. But easy flushing and regreasing are possible.—**Fairbanks, Morse & Co., Inc.**—Power, Mar, p148

**Two-pen Recorder**—Two functions are simultaneously recorded against time by two-pen Speedomax electronic recorder. It saves point-by-point plotting of data. Chart speed range is 1-1,800 in. per hr. Response speed for full pen movement is 3, 2, or 1 sec.—**Leeds & Northrup Co.**—Elec World, Jan 29, p182

**Bags Produce**—Packing machine will handle onions, lemons, apples, oranges, and small potatoes in amounts up to 5 lb. Bagging operation is fast with controlled weighing to ± one piece. Once a bag is placed on one of two filling spouts, automatic weighing and filling occur.—**Triangle Package Machinery Co.**—Mod Packaging, Feb, p136

**Conveyor for Continuous Mining**—Specially designed for continuous mining service, this lightweight, durable, portable conveyor can be easily positioned manually to follow the machine. It is mounted on pneumatic tires and stands 24-in. high. Conveyor is powered by a 3-hp. electric motor and is 20 ft. long.—**Barber-Greene Co.**—Coal Age, Mar, p114

**Brush Has Split-second Brake**—Electric-brake system of new brushing machine is designed to assure instant and simultaneous stopping of all brush rolls together, as well as simultaneous stopping of the shear. Each brush roll has its own motor. Control of the entire system is by the stop button on the shear.—**Hermas Machine Co.**—Textile World, Mar, p166

**Portable Oven**—Industrial electric oven, 29 in. wide by 24 in. deep by 20½ in. high, has fresh air drawn in and stale air driven out by fan on outside of unit. Damper gives wide range of constant temperatures. Ovens can be operated singly or stacked in groups.—**Grieve-Hendry Co., Inc.**—Elec C&M, Feb, p87

**Hot-topping Compound**—Mexatop has enabled one steel company to cut poured height of hot-tops by 2 in. and reduce metal in hot-top by 1½% on maximum weight ingots. Saving is 3,000-4,000 lb. per heat. Mexatop gives U-shaped cavity instead of V-shaped.—**U. S. Graphite Co.**—Iron Age, Feb 1, p37

**Steel Straddle Truck**—Model MHS, especially designed to handle steel, has a 30,000-lb. capacity. It is equipped with double-row roller chains in hoist mechanism, solid bar in lifting links, a heavy frame, and suspension springs. Steel billets and bars are handled on bolsters.—**Hyster Co.**—Steel, Feb. 26, p111

**RAM-JETS POWER HELICOPTER**

Midget two-place helicopter, the Hiller Hornet, weighs only 340 lb. and is designed to sell for less than $5,000. It is powered by two 11-lb. ram-jet engines at ends of rotor blades. Each ram-jet develops 31-lb. thrust. Machine is started by 1-hp. two-cyl gasoline engine that rotates blades to 150 rpm., at which point ignition system is cut in. Load capacity is 560 lb.—Prod Eng, Mar, p149

**Filter Cleans Self**—Model SC filter has circular disks mounted on center shaft and enclosed in cylindrical pressure tank. Each disk is cloth covered. Nylon brushes set between disks and connected to revolving brush cage sweep disk surfaces clean.—**Sparkler Mfg. Co.**—Paper Ind, Feb, p1212

**Wooden Pallet Collapses**—This pallet can be packed into a space-saving unit for ship-and-return work. It can be adjusted to any size or shape to suit the pallet load. The pallet has four wooden legs mounted in steel plates. Each leg consists of two parallel strips with space between for lift forks.—**Spring Woods Products, Inc.**—Factory, Mar, p164

## *READER SERVICE*

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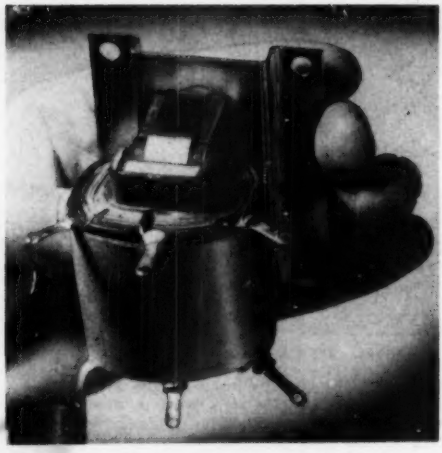
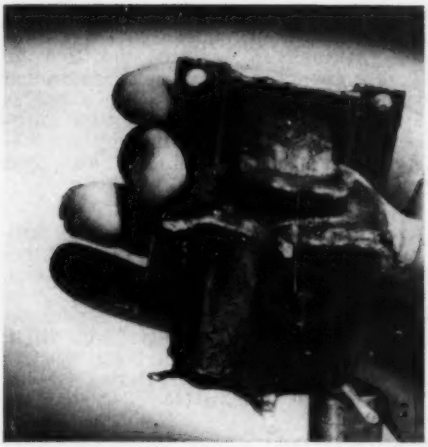
*—THE EDITORS*



*RADIO TRANSFORMER, shown before treatment, is impregnated with a liquid resin that is retained by a baked resin casing*



*FINISHED TRANSFORMER is completely protected from moisture, fungi or mold growths, and attack by corrosive atmospheres*

# Use Plastics for Potting

**Successful potting of electrical and mechanical components calls for versatile materials. Plastics supply necessary requirements**

ENCASING INSTRUMENTS or other components in a solid mass of plastic results in these advantages:

1. A potting compound will increase the unit's resistance to dislocation because of shock.
2. Heat is dissipated through the plastic, providing an improved and more uniform performance.
3. Good dielectric properties of the potting compound minimizes leakage of electric currents.
4. A relatively inert potting compound will provide the best protection of parts from fumes and corrosive atmospheres.

The following is a discussion of some of the materials available as potting compounds.

**Phenolics**—Strong acid catalysts employed for rapid setting may be detrimental to the elements being potted. Poor dielectric behavior at high frequencies is experienced.

**Furanes**—Their low viscosity permits tolerance of large amounts of inert fillers. They are dependent, however, upon acidic catalysts and subject to the same conditions that limit use of phenolics.

**Polyesters**—The many types of polyesters yield flexible to rigid products. They may be utilized with or without fillers and, in the absence of volatiles, afford many good characteristics for potting.

**Silicones**—Heat resistant, rubber-like compounds are available from silicones. The silcone potting compounds, cured at temperatures of about 300° F., combine good electrical and heat properties.

**Modified Styrene**—A modified styrene developed by the U. S. National Bureau of Standards is finding applications in

potting electronic components. Employing styrene and dichlorostyrene as major constituents of this resin reduces high-frequency dissipation factors.

**Methyl Methacrylate Monomer**—Large shrinkage, critical curing temperatures, and high exotherm have thus far kept this material from extensive applications in potting.

**Styrene Monomer**—Long polymerization cycle (2 or 3 days) at a high temperature has slowed the acceptance of this material as a potting compound.

**Waxes**—Nitro waxes, paraffin wax, chlorinated waxes, carnauba wax, montan wax, micro crystalline waxes, and other waxes have been considered for potting purposes. Addition of cellulosic derivatives and synthetic resins has extended their melting points.

**Hot Melts**—Hot melts of polyvinyl chloride and cellulosic derivatives possess rubber-like qualities when cured. They are viscous and require air pressure or vacuum during the potting procedure.

**Polyvinyl Plastisols**—They are fluid at room temperature and may be gelled by heat to a rubber-like mass. Moderate viscosity at room temperature permits easy penetration into small spaces.

**Ethoxylines** — (McG-H Digest, Jan, p39). The resin flows freely at 260 to 270° F. It can be cast into suitable containers after adding a liquid hardener. No volatiles are given off and no exothermic reaction occurs. Shrinkage is small. —Mod Plastics, Mar, p64

## Disposable Extinguisher

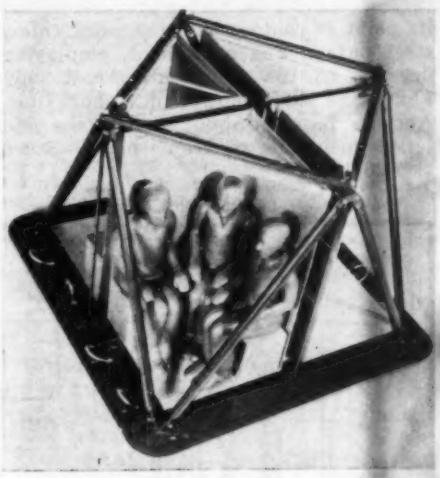
A fire extinguisher that can be used once and thrown away is under development by U.S. Army Engineer Research & Development Laboratories. The new container will handle trifluorobromomethane, likewise an ERDL discovery. The extinguisher is a light-wall metal container with valve head and fragile disk release. Weight is only 1 lb., half as much as a conventional extinguisher. Capacity is a 3-lb. charge.—Prod Eng, Mar, p150

## Ultrasonics Lab Experiments Show Some Unusual Effects

Recent laboratory experiments made at the University of Missouri on ultrasonics show promise for future application in research, industry, and communications. Experiments were made with a generator in which the transducer rests in a dish of xylene or some other liquid of high dielectric strength.

• If the closed end of a glass tube, about a foot long and ½ in. in dia. and coated inside with heavy oil, is subjected to ultrasonic energy, the oil gathers into rings 1 or 2 mm. apart, lining the tube.

• Ultrasonic energy can also make a glass rod burn through wood. The rod, which tapers and is ½ mm. at the tip,



CANNED MEN FROM THE SKY

Parachuting soldiers a dozen at a time is latest U. S. Air Force idea. Picture shows a mockup of combination personnel and cargo carrier being developed by Stanley Aviation Corp. With two parachutes, it will support 12 soldiers or 6,000 lb. of cargo. It is made of plywood, with tubular framework and light metal flooring. Under floor are four air bags, to cushion shock of landing.—Business Wk, Feb 24, p40

can be made to transmit vibrations of such intensity that the rod will burn rapidly through a wood chip. Heating occurs only at point of contact.

• If a volatile liquid such as benzol is sonized, the ultrasonic energy throws up innumerable minute droplets. The droplets form a smoky white benzol fog, much like the cloud of fine spray projected upward by a shock wave from an underwater explosion of a depth charge.

• If water containing an ice cube is sonized for a few minutes, the cube will break into small fragments when squeezed. Cause is internal liquifaction. —Electronics, Mar, p82

## $CO_2$ Lengthens Hob Life

Startling increases in hob life resulted from blowing cold carbon dioxide gas through a 0.009-in. orifice over the tool at its point of contact with the work (alloy steel bars). The equipment, employing dry ice as the $CO_2$ source, cost only $1,200 and paid for itself in a short time. Another possible application of the $CO_2$ jet is in drilling of armor plate.—Steel, Feb 26, p71

## Crystal Amplifier Broadens Low-Power X-Ray Inspection

New discovery by General Electric X-Ray Corp. promises high-speed, automatic X-ray inspection of thousands of industrial products.

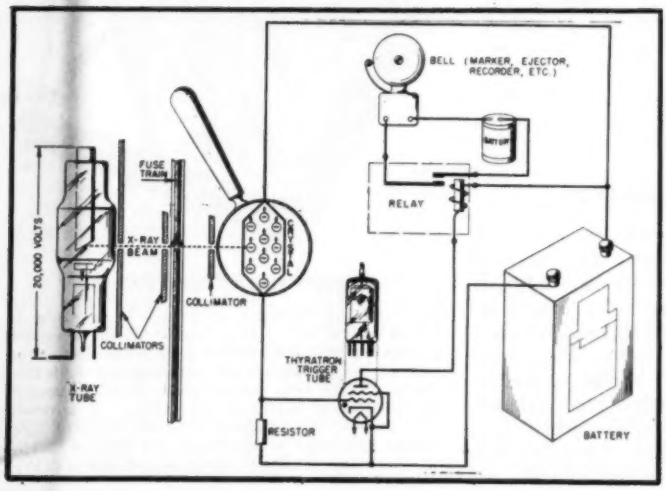
Heart of the system is a small crystal of cadmium sulfide. When excited by radiation, it acts as an amplifier tube and releases streams of electrons that can be made to operate various types of mechanisms.

Cadmium sulfide crystals amplify energy by 1-million times. On an area-for-area basis, they are a million times more sensitive to X-rays than are the ionization chambers commonly used to measure X-radiation and a thousand times more sensitive than photoelectric cells.

Pilot laboratory models have been built to inspect rubber heels; the product level of baby food, beer, and other canned products in containers; and the continuity of powder trains in blasting fuses.

Equipment needed is a small X-ray unit operating at about 20,000 volts and 1 ma., plus a small crystal in a holder, a control box with one or two vacuum tubes, and a relay to operate a signal device. A ¼-in. void in the powder train inside a ¼-in. cord can be detected at 60 ft. per min.

The relay can be made to ring a bell, operate a meter, chart a graph, work a rejection lever to eject the product, flash a light, or stop the production line. —Steel, Feb 26, p82




***CIRCUIT DIAGRAM shows how blast-fuse discontinuity is signaled***

## New Packaging Equipment Speeds Frozen Food Packing

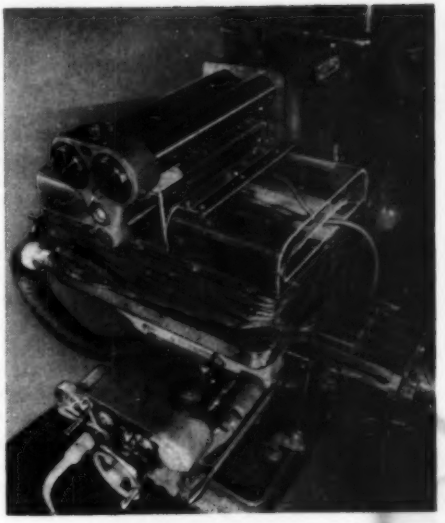
Packers of frozen food have long sought some way to combine these requirements: (1) an inexpensive carton, (2) automatic filling, and (3) continuous high-speed operation.

Food Machinery & Chemical Corp. has built a machine that does the job. The new equipment sets up the end-opening carton automatically, fills it automatically, closes it automatically with a lock-tab, and operates at speeds of better than 200 containers a minute. The machine operates only with free-flowing items, such as peas, cut corn, and lima beans.

Cartons come as pre-formed folded blanks. An operator feeds them into the forming machine by stacking blanks on end. A suction cup picks up the blanks, one at a time, and moves them along to the opening station. There, mechanical fingers insert into the carton, forming it against a die of the shape and dimensions of the finished package. The carton moves to the next station where the bottom is folded and locked into place.

A moving belt carries the package to a multiple-spout filling head. Vegetables feed into the filling head through an overhead chute, pass into a large hopper and from there to individual filling cups. Measurement is volumetric. The entire filling head rotates, carrying on its outer edge the packages to be filled.

Filled packages move along a stainless-steel belt to two overwrapping machines. —Mod Packaging, Feb, p106



ATOMIC-RESEARCH MACHINING

**Exposure encountered in machining toxic or radioactive material at Argonne National Laboratory is brought within safe working limits by enclosing working areas of machines. This milling-machine enclosure has steel pan fastened to table and Lucite sections supported by arbor and brackets. Fiberglas-lined bellows complete enclosure. Chips are caught in pan so they cannot contaminate machine but can be easily recovered. Air within closure is exhausted to fan house for cleaning before discharge outside.—Am Mach, Feb 19, p133**

## Argon Welding in Australia

Recent availability of high-purity argon in Australia has encouraged use of inert-gas-shielded arc welding to fabricate aluminum and copper products.

Colonial Sugar Refining Co., Ltd., built six storage vessels 13 ft. long and 8 ft. in dia. from $\frac{3}{16}$-in. 1S aluminum sheet. A filler rod of the same material was deposited in the weld joints with the inert-arc torch. Colonial also employed the process to weld pure silver piping for its refinery.

Nobel (Australia) Pty., Ltd., has installed nitro-glycerine storage tanks inert-arc-welded from deoxidized copper sheet. The same plant also uses argon-arc-welded aluminum "dope" buggies.

Electrolytic Zinc Co. of Australasia, Ltd., deposits zinc electrolytically from inert-arc-welded aluminum cathodes. They are made by joining $\frac{1}{4}$-in. aluminum sheet to case aluminum head bars.—Weld Eng, Mar, p60

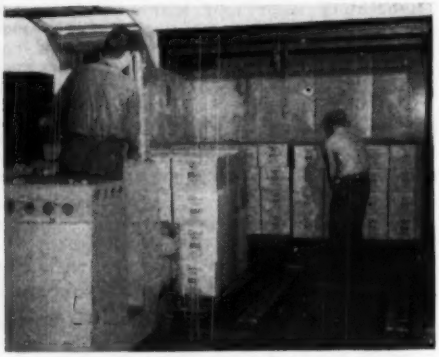
## Refinery Processes Wastes Into Saleable Fertilizer

General Petroleum Corp. is turning two refinery waste products into a profitable chemical by-product. A nitrogenous component of waste refinery goods is reacted with sulfuric acid sludge to produce ammonium sulfate fertilizer.

The nitrogenous component of the waste refinery gases is bubbled through acid sludge, producing a solution of ammonium sulfate. Crystals are formed in the liquid by partial evaporation.

Resulting ammonium sulfate crystals are separated by a centrifuge and blown into a hopper from which trucks can be loaded by gravity. The crystals contain over 20.9% nitrogen.

Unique feature of the process is that instead of using pure sulfuric acid—a critical defense material in short supply—the unit uses acid sludge, another refinery waste. Getting rid of acid sludge has always been a tough and expensive disposal job at refineries.—Chem Eng, Mar, p190



ROLLER CONVEYOR LOADS ELEVATORS

Sections of roller conveyor on the floor near the elevator shafts and inside the elevators simplify materials handling at the Philadelphia Refinery of Gulf Oil Corp. A fork truck leaves pallet loads of materials—enough to fill the elevator—on the roller conveyor in front of the shaft. The elevator operator easily pushes the load onto matching roller sections in the elevator by hand. At destination the operation is reversed.—Factory, Mar, p112

## Tide Lowers Span into Place

Eleven mid-channel spans of Boston, Mass., Long Island Viaduct were lowered into place by tide action. Contractor for the job was Bethlehem Steel Co.

Spans were erected on two 30x110-ft. barges tied up to a railroad dock. Members from two end-spliced girder spans helped crib up the spans for clearance above piers.

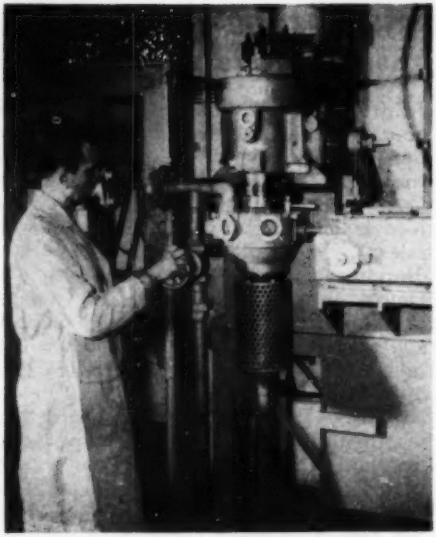
The spans were then floated into position between piers. From each No. 1 panel point, a 1-in. cable ran diagonally to a 3-ton come-along, in turn fastened to the inner anchor bolt of each steel shoe on the piers. Double block and tackles were hooked to steel anchors fastened to outer bolts running straight out to chokers a few feet shy of the panel point. Lateral and longitudinal adjustments thus controlled and guided the 300-ton spans to their proper position as the tide fell.—Const Meth & Equip, Mar, p58

## More Payload with Mg Floor

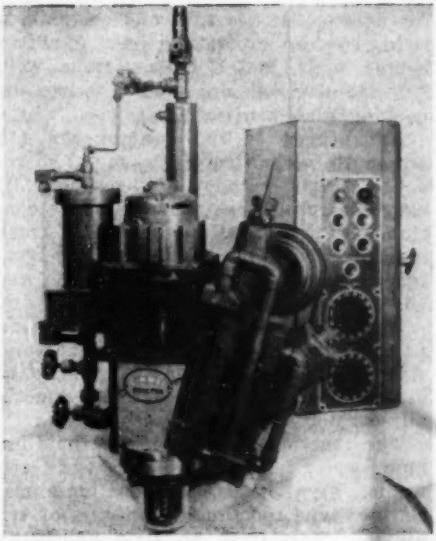
From 900 to 1,100 lb. per truck trailer can be gained in extra pay load by using magnesium flooring. Aside from weight saving, extruded magnesium flooring possesses these advantages: it will not warp, splinter or rot; it is much easier to clean; and users report duct-type flooring cools more efficiently than a wood floor with duct boards.

Magnesium flooring costs roughly 4 times as much as oak. But it can be laid in the trailer in considerably less time.

Market acceptance and service experience with this new type flooring have been good. Magnesium flooring is now standard equipment on some truck-trailer models.—Fleet Owner, Mar, p63



*COMMERCIAL-SIZE pilot model shows that Cimmac reactor is practical in processing plant*



*LABORATORY MODEL is similar to those in use by three large chemical manufacturers*

# Cutting-Tool Chemical Reactor

**New type chemical reactor simplifies preparation of organometallic compounds, is safe and fast, and makes continuous reaction possible**

MILLING MACHINE that synthesizes chemicals is the new Cimmac reactor. It now has been developed to the commercial stage by Carlisle Chemical Works, a subsidiary of the Cincinnati Milling Machine Co.

The reactor stems from a chance discovery made in 1939. Researchers of Cincinnati Milling Machine Co. were doing basic research on metal cutting. They were turning aluminum with carbon tetrachloride as the coolant. To their surprise, they noticed on the metal a white deposit that turned out to be aluminum chloride. They then substituted isopropyl alcohol for the carbon tetrachloride and got aluminum isopropoxide.

Key to the process is the mechanical activation of the metal by cutting it in the presence of the other reactants. High temperature, high pressure, and a nascent, highly stressed metal surface are produced at the point of contact between tool and work. So that point becomes an almost dismensionless, natural autoclave.

The Cimmac reactor, in its present state of development, consists of a reaction chamber to hold liquid reactants, a rotating cutter, and a mechanism to feed the metal against the cutter. The chamber is fitted with baffles, between which four knife-edge vanes revolve on the shaft extension connected to the cutter. Agitation disintegrates the metal chips to provide more nascent metal surface.

The reaction chamber also has a port

for addition of reactant and solvents, a reflux condenser, inlet for inert gas, two heater wells, and a thermocouple well. All chamber openings have valves or packing glands to exclude air.

Advantages of this reactor are (1) automatic activation of the metal so reaction starts without any trouble, (2) easy control as reaction takes place continuously with small increments of fresh metal, (3) possibility of switching from batch reaction to continuous reaction, and (4) no danger from fire or toxic vapors.

The firm has synthesized many compounds during the development work. Among them are phenylethyl alcohol, di-p-chlorophenylmethylcarbinol, dimethallylcarbinol, and diallylcarbinol.

The reactions facilitated by the Cimmac reactor include preparation of Grignards, organozincs, organoaluminums; Barbier-type reactions (synthesis of trialkylcarbinols from an alkyl halide, an aliphatic ketone, and magnesium; the Reformatski reaction; preparation of metal alkoxides; coupling reactions; metal reductions with iron or zinc; and catalytic hydrogenation and polymerization.

## How to Keep Cherries Longer

Storage life of brined sweet cherries can be lengthened and grade lowering of the processed maraschino type avoided by treatment of brine, sugar syrup, and cherries with calcium phytate. The phytate removes iron, which in amounts as small as 25 parts per million causes discoloration of the fruit.

The procedure is carried on in five principal steps:

1. Heat fruit in 50° Brix sugar syrup to 150–160° F.
2. Adjust sugar to 3.0 pH with citric acid crystals.
3. Add calcium phytate—0.2% of fruit weight.
4. Let stand 24 hr.
5. Filter to remove precipitate.—Food Ind, Mar, p91

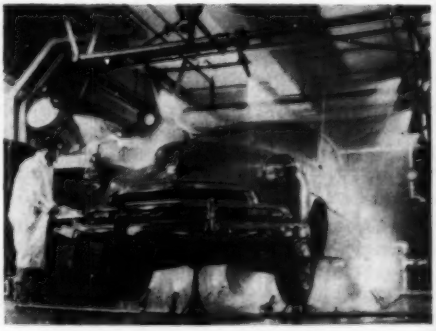
## Jeep First Digs Trenches, Then Backfills Them

Jeep equipped with attachments is digging trenches and backfilling them for Consolidated Edison Co. of New York, Inc. It also pulls cable into duct.

A trencher fitted on the back of the jeep is powered from the 15-hp. power takeoff. It digs a 10-in. wide by 5-ft. deep trench at 4-6 fpm. The jeep advances in a straight line as it digs through the use of a cam and ratchet and steering-wheel lock bar. When not in use, the trencher is raised and rides upright on the back of the jeep.

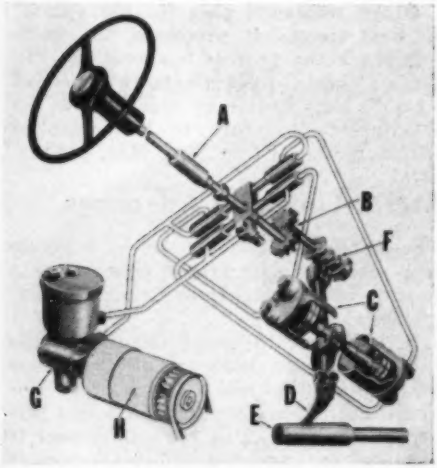
After the distribution facilities, whether electric cable or gas pipe lines, are laid, the jeep backfills the trench with a snow-plow attachment on its front. When the trench is filled, the jeep rides the trench to pack the dirt.

In place of the snow plow, the front of the jeep can be fitted with a hydraulic winch. Sixty feet of ½-in. steel cable pulls service, streetlighting and secondary cables.—Elec World, Mar 12, p124



TESTS BODIES FOR LEAKS

Chevrolet automobiles are tested for leaks by spraying 500 gal. of water under high pressure over body while a vacuum inside body tries to pull in moisture. The 4-min. blast must be withstood by each experimental Fisher Body model before it is approved for production.—Steel, Mar 5, p65




***PARKING AND STEERING** automobiles will require less effort from the driver when . . .*

## Hydraulic Booster Cylinders Help Steer Automobile

The Imperial and New Yorker models manufactured by Chrysler Div., Chrysler Corp., will feature a hydraulic power steering system made by Gemmer Mfg. Co. The system practically eliminates all work the driver has in steering the car.

Here is how power steering works: The steering shaft is built in two pieces poined by a universal joint (*A*). The lower half of the shaft has a little play in it, leaving it free to tilt up and down.

When the steering wheel is turned to the left, a spur gear (*B*) at the end of the shaft starts to climb up its mate beside it. This raises the lower half of the shaft, opening two valves. Hydraulic fluid rushes into one of two booster cylinders (*C*) (one for each direction), forcing the piston to move the steering linkage (*D*, *E*).

In moving the tie rods, the piston also rotates a gear facing on the worm gear (*F*) of a standard mechanical linkage. This in turn rotates the worm gear faster than the steering wheel is turning it; so the spur gear (*B*) at the end of the steering shaft is pushed down, closing all valves and holding the wheels where the driver turned them.

Gearing ratio allows about 3½ turns of the steering wheel for full front wheel swing, as compared with 4 to 5 turns for manual steering.

Hydraulic power is obtained from a pump (*G*) direct connected to the generator (*H*).—Am Auto, Mar, p35

## Air Shafts Are Escapeways

A portable hoist and portable cage have been assembled and are kept in readiness to make every shaft at the Rosita No. 6 mine, Coahuila, Mexico, a potential escapeway.

The hoist, powered by a gasoline engine, is permanently mounted on a truck that also tows a trailer carrying the cage. Four men wearing oxygen breathing apparatus can be carried in the cage. Rounded ends of the cage permit it to pass obstructions in or around the shaft.

The steel headframes and sheaves used in sinking the air shafts are left in place to be available for emergency hoisting.—Coal Age, Mar, p108

## Forge-Taper Forms Wing Span

An aluminum-alloy wing span has been experimentally fabricated for a McDonnel Aircraft Corp. fighter plane by a new forge-taper process.

Aim of the new approach is to eliminate the comparative complexity required in the usual method of using two T-sections and successively smaller web members to achieve spar taper.

Feature of the method is a bulb section of what would otherwise be an I-beam type extrusion. The extrusion is forged so that the bulb is flattened progressively to give 5¼-in. web taper in 13 ft. of spar length.—Aviation Wk, Mar 5, p19

**MIRROR AIDS INSPECTION**

**Tiny mirror, less than ⅛ in. in dia., reflects light through a 2-ft. tube to an eyepiece. Here an inspector uses the mirror to check machining on the inside diameter of a forging. He is looking for chatter marks or tool scratches.—Factory, Mar, p130**

## Paint Is Sensitive to Heat

With temperature-sensitive paints, the entire surface of an engine or similar piece of equipment may be painted with a particular color. An irreversible change of color indicates when the temperature of the entire surface, or any part thereof, has attained or exceeded a predetermined value. Resulting color patterns give information on the temperature of the entire surface at a glance.

The paints, originally a product of I. G. Farbenindustrie, are distributed in the U. S. by the Tempil Corp., come in 15 basic shades. Socony-Vacuum Oil Co. is using them in studies of cooling processes for air-cooled internal combustion engines. Heat-transfer qualities of lubricants as well as the efficiency of air-cooling arrangements are also being studied by Socony-Vacuum Oil Co.

Other suggested uses for the paints: In heat treatment processes, the paint will check the process temperatures. In hot working of light alloys, two spots of suitable paints, side by side, enable the working temperature to be controlled within limits.—Chem Eng. Mar, p164

## Metal-Finishing Advances

The metal-finishing industry is enjoying new processes and marked improvements in old techniques. Here are a few examples:

• Newcomer to metal cleaning is the di-phase cleaner consisting of an aqueous alkaline solution and a hydrocarbon solvent. Ingredients separate into two layers in the bath. This type of cleaner is excellent for removing buffing compounds and similar stubborn soils. In the bath, each phase removes the soil it preferentially wets or dissolves.

• Recent advance in chromium plating is the fluosilicate solution. It plates bright, even with current interruption, and has a wide bright range and good throwing power. Barrel plating should improve with this solution.

• New scratch- and wear-resistant hard coating for aluminum has been developed by Glenn L. Martin Co. The MHC finish has a wear resistance superior to that of hard chrome plating or cyanide case-hardened steel. Coating is file-hard, smooth, and heat-resistant.—Iron Age, Feb 22, p78

***Have You Read Page 22?***

**If you are a producer of raw materials . . . or a user of raw materials . . . or a buyer of manufactured goods from the U. S., you should read "U. S. Foreign-Trade Outlook" on p 22. It tells . . .**

**• What rearmament will do to U. S. foreign trade.**

**• What the prospect is for raw materials.**

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**• What will happen to priorities for the export of U. S. goods.**

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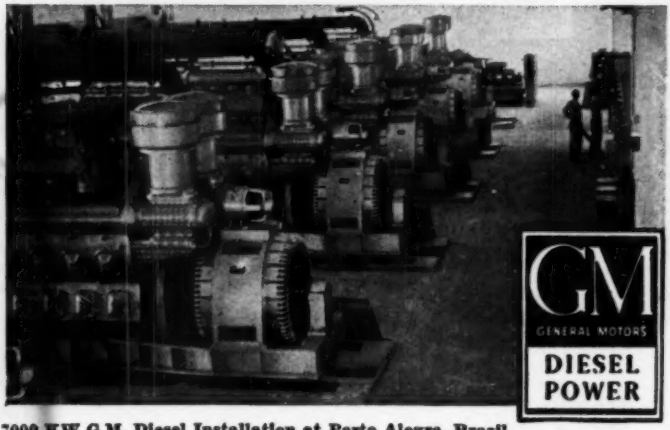


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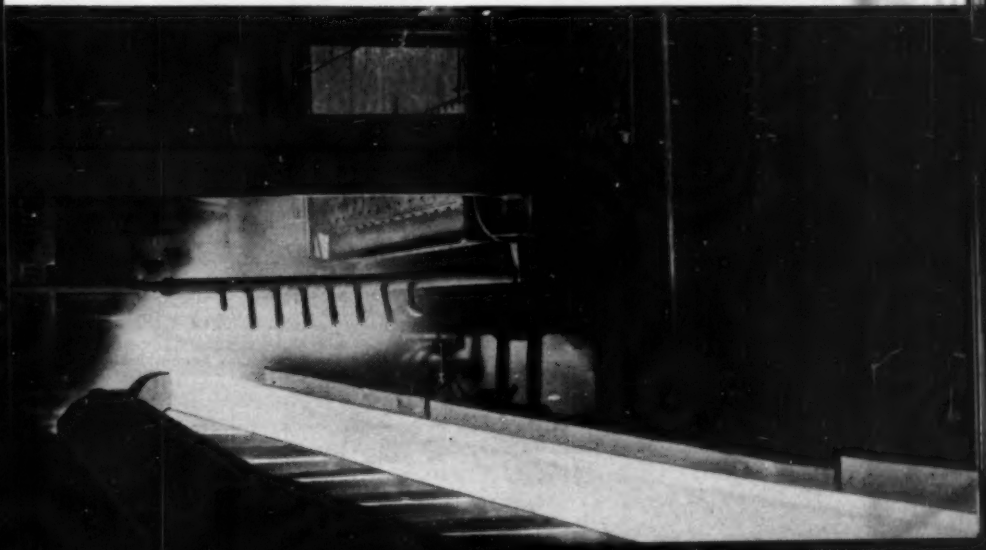

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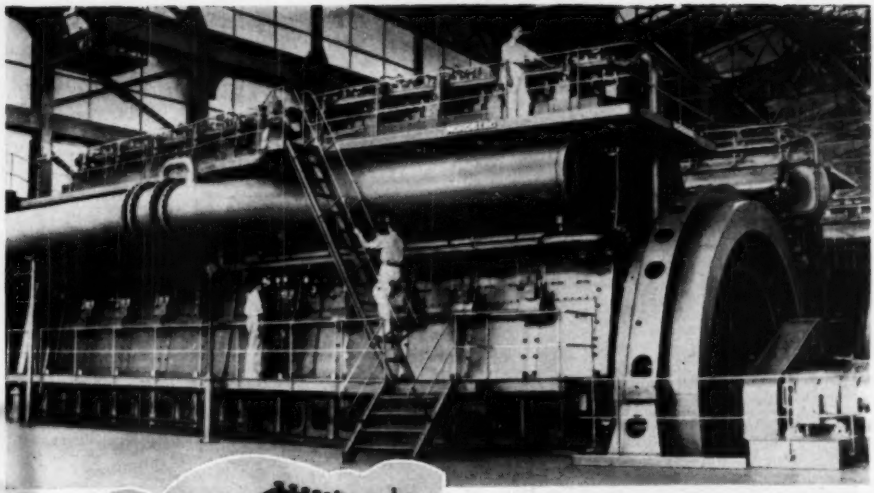

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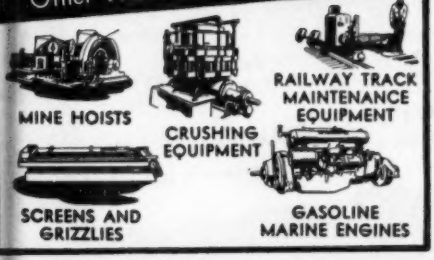


**NORDBERG MFG. CO., Milwaukee 7, Wis., U.S.A. CABLE ADDRESS: NORDBERG**

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Cyanamid

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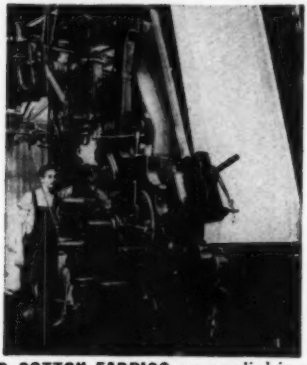
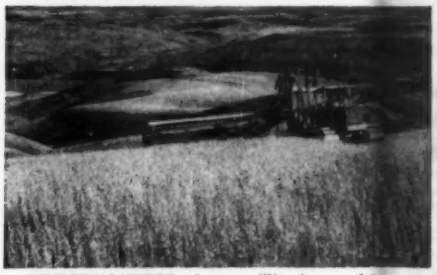


**COLORED COTTON FABRICS** are supplied in numerous, appealing designs by high speed machines like the one shown. The colors used must meet high standards—superior aniline blacks, for example, made from Cyanamid's AERO* Brand Yellow Prussiate of Soda and Yellow Prussiate of Potash. These blacks, in combination with vat dyes, rapid fasts and steam colors, possess good printing properties for both cotton and rayon, producing dense tones with a minimum tendering of the fabric.

*Trade-mark

**INFORMATION ON THESE AND OTHER CYANAMID PRODUCTS** for drug, textile, leather, rubber, paper, ink, plastics, paint, mining and other industries is available on request. Write for more information or see one of our representatives, who will be glad to help you.

**WET PAPER IS STRONG PAPER** if it is treated with Cyanamid's PAREZ® Resins. These resins not only improve the wet strength of paper, but increase its dry strength as well. Thus, the uses for paper are broadened, its dependability increased in such applications as grocery bags, frozen food containers, napkins, wiping cloths, map and blueprint papers . . . to mention a few. Perhaps PAREZ Resins can improve the quality of *your* paper products.



**TEMPERING WHEAT** prior to milling is one of the more recently reported uses of Cyanamid's AEROSOL® OT Wetting Agent. Another report indicates that this versatile compound improves the wetting power of water used to dampen down silica dust. A third source cites its value in increasing the fired characteristics of ceramic bodies. Wheat . . . ceramics . . . silica dust . . . *your application* . . . AEROSOL Wetting Agents may be the answer to your problem.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